



City of Napoleon, Ohio

Zoning Department

255 West Riverview Avenue, P.O. Box 151

Napoleon, OH 43545

Mark B. Spiess, Senior Engineering Technician / Zoning Administrator

Telephone: (419) 592-4010 Fax: (419) 599-8393

www.napoleonohio.com

COMMERCIAL PERMIT

Issued Date: February 11, 2019

Expiration Date: February 11, 2020

Permit Number: P-19-012003

Job Location: 850 Vocke St.

Owner: City of Napoleon
255 W. Riverview Ave.
Napoleon, OH 43545

Contractor: Speelman Electric
330-633-1410

Zone: I-1 Enclosed Industrial

Set Backs: Principle Building

Front: None Rear: None Side: None

Comments:

Upgrade (6) existing remote radio head units and remove (3) existing remote radio read units.
Verizon Wireless equipment upgrade for antennas on watertake.

Permit Type: Zoning

Fee: \$50.00

Status: Paid

Amount Due: \$0.00

Mark B. Spiess
Sr. Eng. Tech / Zoning Admin.



City of Napoleon, Ohio

Zoning Department

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Napoleon, OH 43545

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Commercial Zoning Permit Application

Date 1-2-19 Job Location 850 Vocke St (Water Tank)

Owner City of Napoleon Telephone # _____

Owner Address P.O. BOX 151, Napoleon, OH 43545

Contractor To be determined Cell Phone # Contact Rodney Lafferty (agent) 740-252-7410 for questions

Description of Work to be Performed Upgrade (6) existing remote radio head units and remove (3) existing remote radio head units. Verizon Wireless equipment upgrade for antennas on water tanks

Estimated Completion Date 4-30-19 Estimated Cost \$2500.00

	TOTAL COST
Demo Permit - \$100.00 - See Separate Form (MDEMO 100.1700.46690)	\$
Zoning Permit - \$50.00 (MZON 100.1700.46690)	\$ 50 -
Fence - \$25.00 (MZON 100.1700.46690)	\$
Garage and Shed Under 200 SF (Detached) - \$25.00 (MZON 100.1700.46690)	\$
Driveway/Sidewalk/Curbing - \$0.00	\$
Outside Water/Sewer Repair - \$0.00	\$
1" Water Tap, 5/8" Meter, Copper Setter and Transmitter - \$1,200.00 (Outside City - \$1,680) (MLBDG 510.0000.47300)	\$
1" Water Tap, 3/4" Meter, Copper Setter and Transmitter - \$1,300.00 (Outside City - \$1,820) (MLBDG 510.0000.47300)	\$
1" Water Tap, 1" Meter, Copper Setter and Transmitter - \$1,400.00 (Outside City - \$1,960) (MLBDG 510.0000.47300)	\$
1 1/2" Water Tap and Larger - See Operations Superintendent	\$
Sanitary Sewer Tap - \$600.00 (MLBDG 510.0000.44730)	\$
Sanitary Sewer, Multifamily 51 ft or more - \$100.00 + \$10.00 for each 50 ft increment (MLBDG 510.0000.44730)	\$
Plan Review - \$200.00 (MLBDG 510.0000.44730)	\$
Sewer Main Extension in Right of Way Inspection - 2% of Construction Cost (MLBDG 510.0000.44730)	\$
TOTAL FEE:	\$ 50 -

I FULLY UNDERSTAND THAT NO EXCAVATION, CONSTRUCTION OR STRUCTURAL ALTERATION, ELECTRICAL OR MECHANICAL INSTALLATION OR ALTERATION OF ANY BUILDING STRUCTURE, SIGN, OR PART THEREOF AND NO USE OF THE ABOVE SHALL BE UNDERTAKEN OR PERFORMED UNTIL THE PERMIT APPLIED FOR HEREIN HAS BEEN APPROVED AND ISSUED BY THE CITY OF NAPOLEON ZONING DEPARTMENT. I hereby certify that I am the Owner of the named property, or that the proposed work is authorized by the Owner of record and that I have been authorized by the Owner to make this application as his/her authorized agent and I agree to conform to all applicable laws of the jurisdiction. In addition, if a permit for Work described in this application is issued, I certify that the code official or the code official's authorized representative shall have the authority to enter areas covered by such permit at any reasonable hour to enforce the provisions of the code(s) applicable to such permit.

I HEREBY ACKNOWLEDGE THAT I HAVE READ AND FULLY UNDERSTAND THE ABOVE LISTED INSTRUCTIONS.

SIGNATURE OF APPLICANT [Signature] (agent) DATE: 1-2-19

BATCH # _____ CHECK # _____ DATE _____



November 26, 2018

Amy Sabo
 Verizon Wireless
 18 Abele Road
 Bridgeville, PA 15017

RE: Existing Water Tank Structural Analysis
 Site Location: 850 Vocke Street, Napoleon, OH
 Site Number / Name: 387095 / Maumee River
 Terra Project: 48-589

Dear Amy,

Terra Consulting Group, Ltd. is pleased to submit this structural analysis of the existing water tank structure for the telecommunication equipment additions proposed by Verizon. This analysis is consistent with the 2017 Ohio Building Code, ASCE 7-10 and ANSI AWWA D100-11 for the following criteria:

Table 1 – Wind Loads

Ultimate Wind Speed/Basic Wind Speed without Ice	Basic Wind Speed with Ice & Design Ice Thickness		Risk Category	Exposure Category	Topographic Category
115/89 MPH (3 second gust)	40 MPH (3 second gust)	1"	IV	C	1

Table 2 – Seismic Loads

Seismic Site Class	Seismic Design Category	Ss	S1
D	C	0.120	0.056

Table 3 – Existing and Proposed Antennas

Mount Elevation	Antenna Centerline Elevation	Quantity	Antenna Model	Status	Cables
168'-0"	175'-0"	9	Andrew SBNHH-1D65C	Existing	(6) 1 5/8" Coax (3) Hybrid
		3	Airscale B5/B13 320W	Proposed	
		3	Airscale B2/B66a 320W	Proposed	
		3	Commscope RXXDC-3315-PF-48	Existing	

The proposed antenna and water tank information was provided by Verizon Wireless. If the antenna loading is different than shown in Table 3 or if the existing conditions in the field vary from the referenced documents, Terra Consulting Group, Ltd. should be notified to analyze the revised conditions.



November 26, 2018
Site Location: 850 Vocke Street, Napoleon, OH
Site Number / Name: 387095 / Maumee River
Terra Project: 48-589

The tower is 168'-0" tall elevated on eight braced legs. The Verizon antennas are mounted to the corral located on top of the tank.

The analysis was completed with the following assumptions:

1. The equipment sizes, weights and layout are according to the documents provided.
2. The existing water tower structure is in good condition and without structural defects.
3. All bolts were tightened according to AISC requirements.
4. All pipe members are grade A53 Grade B (35 ksi)
5. All other steel members are grade A36 (36 ksi)
6. The mounts, antennas and appurtenances are as listed in Table 2 and the Final Construction Drawings by Terra Consulting Group, Ltd.
7. The original water tank design was performed in accordance with ANSI AWWA D100 and the governing building code.

Our structural analysis indicates the water tank has **adequate** structural capacity to support the proposed equipment listed in Table 3.

Table 4 – Analysis Results

Component	% Capacity	Results
Mount Primary Members	100% *	Adequate
Water Tank	81%	Adequate

*Actual percentage is slightly less than 100% due to slight decrease in loads from previous analysis

If you have any questions or require additional information, please feel free to contact us.

Sincerely,
TERRA CONSULTING GROUP, LTD.

John Schueler, P.E.





November 26, 2018
Site Location: 850 Vocke Street, Napoleon, OH
Site Number / Name: 387095 / Maumee River
Terra Project: 48-589

STANDARD CONDITIONS FOR PROVIDING PROFESSIONAL ENGINEERING SERVICES FOR
EXISTING STRUCTURES

1. The Standard of Care for all Professional Engineering Services performed by Terra Consulting Group, Ltd. under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.
2. The structural analysis was performed assuming no physical deterioration has occurred to any of the structural components. No allowance was made for members or bolts that are corroded, damaged, bent, loose or missing. The analysis assumes all bolts are torqued to a snug-tight condition defined by AISC.
3. The structural analysis provided verifies the adequacy of the primary structural members of the mount. Complete and detailed information of every secondary component and connection is not available. A limited scope of service is provided by Terra Consulting Group, Ltd. in that we cannot analyze the capacity of every plate, weld, connection, etc.
4. Any sketches included in this document are a schematic representation of the structure and should not be used to fabricate or order any material.
5. The structural analysis was performed according to the minimum design loads recommended by the Reference Standard. The mount analysis does not imply to meet any serviceability criteria such as twist, sway and deflections. If more restrictive design criteria for wind, ice, deflections or serviceability are required, then Terra Consulting Group, Ltd. should be notified.
6. All engineering services are performed on the basis the information supplied to Terra Consulting Group, Ltd. is current and correct.
7. All services are performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. Terra Consulting Group, Ltd. is not responsible for the conclusions, opinions or recommendations made by others based on the information we supply.



November 26, 2018
 Site Location: 850 Vocke Street, Napoleon, OH
 Site Number / Name: 387095 / Maumee River
 Terra Project: 48-589

Water Tower Wind Load Analysis

Wind Load Calculations (AWWA D100-11)

P_w : Wind Pressure (psf)

C_d : Drag Factor = 1.0 Flat
 = 0.6 Cylindrical
 = 0.5 Double Curve

V : Wind Velocity (100mph)

$$P_w = 30 * C_d * \left(\frac{V}{100}\right)^2$$

$$P_w = 30 * C_d * \left(\frac{100}{100}\right)^2$$

P_w = 30 psf Flat
 = 18 psf Cylindrical
 = 15 psf Double Curve

Table 5: Design Wind Force on Water Tower – Original Design

Member	Area (sf)	Wind (psf)	Wind Load (lb)	Centerline Elevation (ft)	Moment at Base (ft-kips)
Tank	2000	15	30000	145	4350
Horizontal Struts	98	30	2940	70	205.8
Bracing Rods	116	18	2088	70	146.16
Column/Riser	1040	18	18720	65	1216.8
Legs.	3240	18	58320	68	3965.76
Misc	56	30	1680	70	117.6
Total:			113748		10002.12



November 26, 2018
 Site Location: 850 Vocke Street, Napoleon, OH
 Site Number / Name: 387095 / Maumee River
 Terra Project: 48-589

Table 6: Equipment Wind Force on Water Tower

Equipment	Quantity	Area per Item (sf)	Wind (psf)	Wind Load (lb)	Centerline Elevation (ft)	Moment at Base (ft-kips)
SBNHH-1D65C	9	8	30	2160	175	378
Airscale B5/B13 320W	3	1.83	30	164.7	175	28.8225
Airscale B2/B66a 320W	3	1.83	30	164.7	175	28.8225
Commscope RXXDC-3315-PF-48	3	2.8	30	252	175	44.1
Mount Frame	1	70	30	2100	168	352.8
Pipe Mounts	15	3	15	675	175	118.125
Cable Enclosure	2	87	30	5220	84	438.48
Existing Dish/Antennas	6	4	30	720	185	133.2
Other Carrier Antennas/Mounts	15	4.53	30	2038.5	132	269.082
Total:				13494.9		1791.432

Overturning Moment Calculations

M_t = Total overturning moment with a factor of safety of 1.5 (10002+1791)*(1.5) = (17690.3 ft-kips)
 X = Distance from overturning point to the center of weight (39 ft)
 W_R = Weight required to resist overturning moment
 W_T = Total weight of empty water tower with foundations (566 kips)
 – from previous report by Harper Engineering

$$\Sigma M = M_t - W_R * X$$

$$W_T > W_R$$

$W_R = 453.6$ kips

$566 \text{ kips} > 453.6 \text{ kips}$ O.K.
 81%

As shown above, the water tower has **sufficient** weight to resist the overturning moment created by wind forces.

Seismic

The overall equipment weight will decrease from the previous passing structural analysis by Krech Ojard & Associates dated 5-26-17. The weight of the antennas and RRU equipment is insignificant in comparison to the weight of the water in the tank and the lateral seismic forces generated under this condition. Therefore, the proposed equipment changes are acceptable for seismic considerations.

USGS Design Maps Summary Report

User-Specified Input

Building Code Reference Document 2012/2015 International Building Code
 (which utilizes USGS hazard data available in 2008)

Site Coordinates 41.3953°N, 84.12056°W

Site Soil Classification Site Class D – “Stiff Soil”

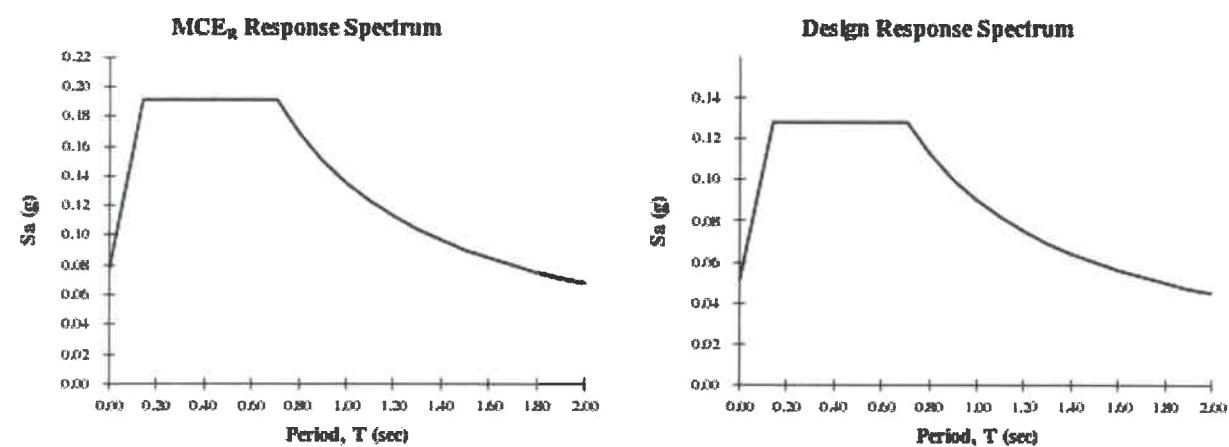
Risk Category IV (e.g. essential facilities)



USGS-Provided Output

$S_s = 0.120 \text{ g}$ $S_{MS} = 0.191 \text{ g}$ $S_{DS} = 0.128 \text{ g}$
 $S_1 = 0.056 \text{ g}$ $S_{M1} = 0.135 \text{ g}$ $S_{D1} = 0.090 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the “2009 NEHRP” building code reference document.



Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.



600 BUSSE HIGHWAY | PARK RIDGE | ILLINOIS 60068
 PARK RIDGE, IL | TEL: 847-698-6400
 COLUMBUS, OH | TEL: 614-754-9106
 COLUMBIA, MO | TEL: 573-777-3555

JOB Maumee River WT
 DATE Nov 2018
 AUTHOR JS
 PAGE OF

MOUNTING PIPE AND RAIL

- Antennas - No Change
- RRH

- Remove

	WT	Area
(3) B13 4x30W	56	246.6
(3) B25 4x30W	53	254.4
(3) B66a 4x45W	57	304.4
	<u>166</u>	

- ADD

(3) B5/B13 320W	73	267.4
(3) B2/B66a 320W	79	267.4
	<u>152</u>	

- Overall RRH weight and wind area decreased
- Loads @ side by side antenna - Replace 2 RRH w/ 1 RRH decreased
- Loads @ Single antenna location

Weight = $79 - 53 = 26$ pound increase
 Area = $267.4 - 246.6 = 20.8 \text{ in}^2$ increase

However, weight and wind area at single antenna location are less than double antenna location.

Therefore, mount framing stresses are not higher than previous passing report by Kirsch Ojard & Associates 5-26-17 and are acceptable.



January 2, 2019

City of Napoleon
Attn: Billy Harmon, Law Director
255 West Riverview Ave
Napoleon, OH 43545

RE: Verizon Wireless – Maumee River (WT), 850 Vocke St, Napoleon, OH 43545

Dear Mr. Harmon,

Verizon Wireless will be upgrading their telecommunications equipment atop the existing water tower located at: 850 Vocke St in Napoleon, Ohio, to maintain the highest level of quality and service for their customer base. Specifically, Verizon Wireless will be removing (9) existing remote radio head units behind the existing antennas and replacing with (6) upgraded remote radio head units (B5/B13 320w RRHs, B2/B66a 320w RRHs) behind the existing antennas. The total number of antennas will remain the same.

Pursuant to the existing Lease Agreement, Verizon Wireless must have the Lessor's written consent to make any such replacements at this site.

Please find enclosed a copy of the passing structural analysis report and stamped construction drawings.

Pursuant to the existing Lease Agreement, Verizon Wireless is asking for your cooperation and your consent to move forward with the installation of new equipment at this site. Please grant your consent with the appropriate signature below and return a copy of this letter to me via email at: rlafferty@sbsite.com.

Should you have questions, feel free to call Rodney Lafferty at 740-252-7410

Sincerely,

Rodney Lafferty
Sr. Property Specialist
7360 Jones Road
Nashport, OH 43830
740-252-7410 – Phone
rlafferty@sbsite.com

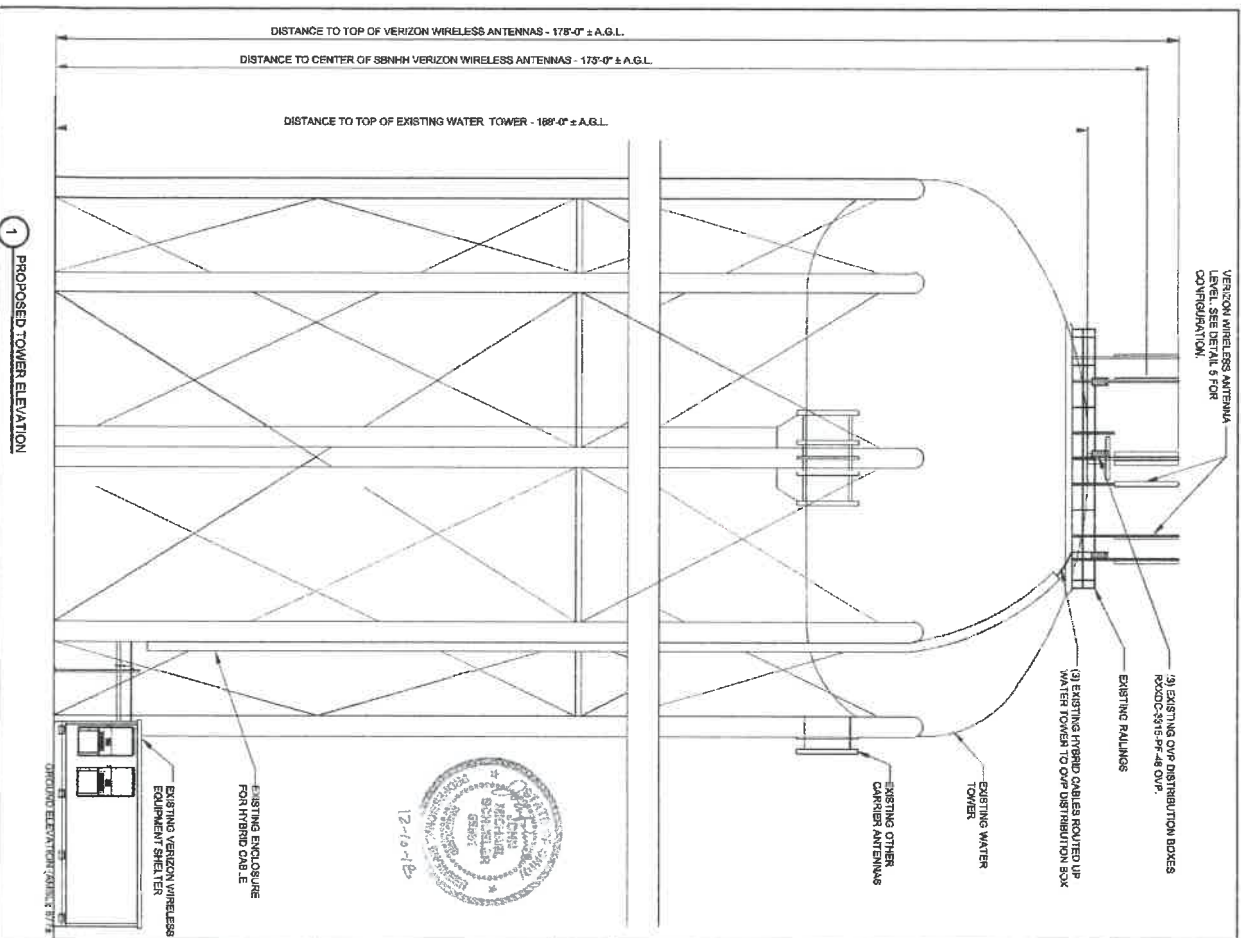
Agreed and Approved this 8th day of January, 2019 by Lessor:

Signature:

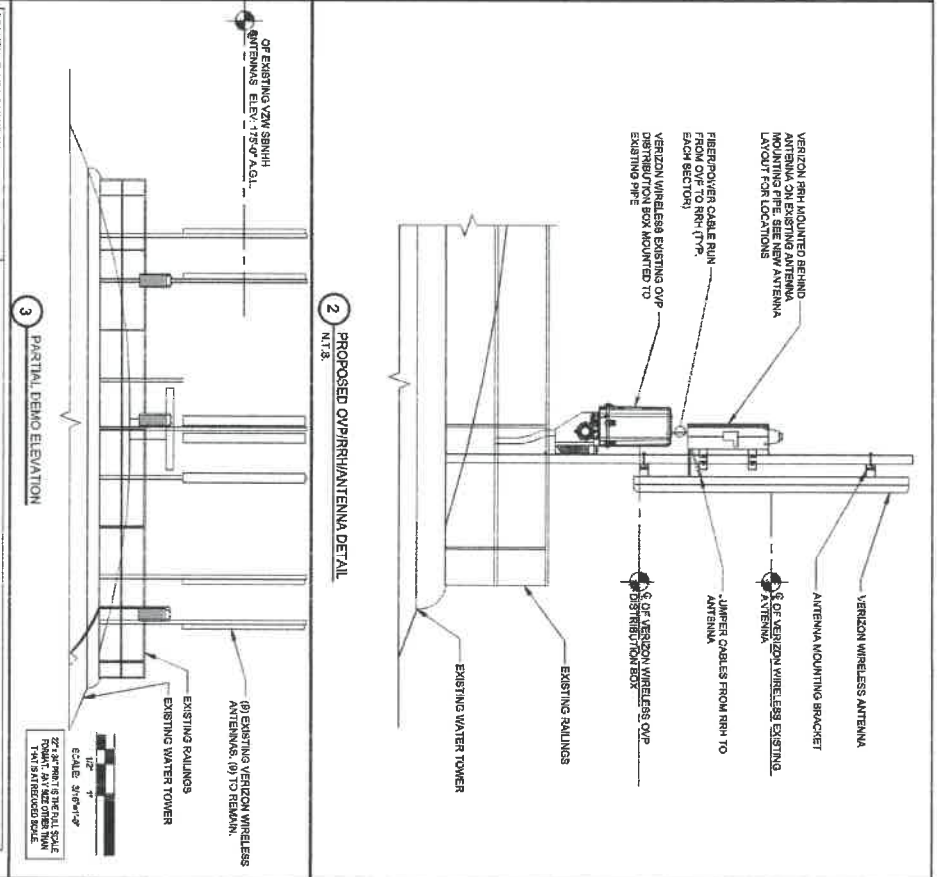
Name: Joel L. Mazar

Title: City Manager

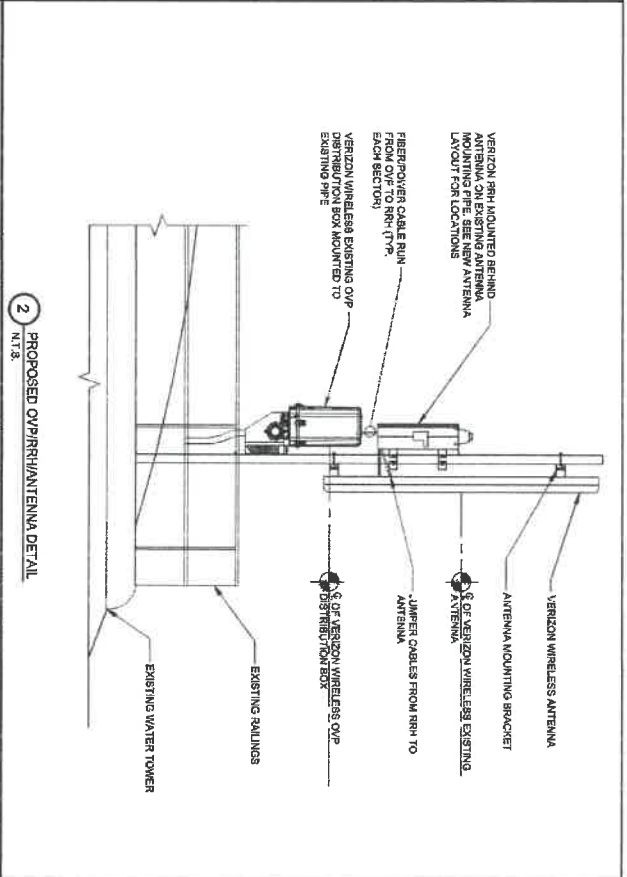
Enc.



1 PROPOSED TOWER ELEVATION



3 PARTIAL DEMO ELEVATION



2 PROPOSED OVER/RIP/ANTENNA DETAIL

- SEQUENCE OF OPERATION:**
1. REMOVE (B) EXISTING RRU B13 AC30W, (G) RRU B24 AC30W AND (S) 888H 4X4S W AND (3) NEW AIRSCALE B23964 320W
 2. INSTALL POWERBUSH FOR DB R3H
 3. RETURN ALL REMOVED EQUIPMENT TO VERIZON WIRELESS

- NOTES:**
1. THIS DRAWING IS FOR EXHIBIT PURPOSES ONLY
 2. PLEASE REFER TO STRUCTURAL REPORT PROVIDED BY OTHERS
 3. NO LIFT ON ANTENNA WORK TO BEGIN PRIOR TO CONFIRMATION OF ADEQUATE TOWER AND MOUNT
 4. ALL EXISTING & PROPOSED INFORMATION PROVIDED BY LL AND VERIZON WIRELESS.
 5. NO NEW ELECTRICAL WORK BEING DONE AND NO NEW VOLTAGE REQUIRED.
- ANTENNA REEVALUATION NOTE:**
1. CONTRACTOR TO INSPECT THE CONDITION OF EXISTING MOUNTING SPIRES. CONSULT THE FOLLOWING:
 - CORROSION: IF MOUNTS ARE FOUND TO BE CORRODED, CONTACT VERIZON REP. FOR DIRECTION.
 - IF BOLTS ARE MISSING, REPLACE TO SUITE.
 - CONFIRM MOUNTING PIPE IS ADEQUATELY SIZE TO ACCOMMODATE PROPOSED ANTENNA INSTALL.
 2. ALL WORK SUBJECT OF THIS DRAWING DESCRIBED IN ACCORDANCE WITH 2017 OBC AND AMENDMENTS.

LATITUDE: 41° 23' 43.4" N
 LONGITUDE: 84° 01' 13.0" W

387095
 MAUMEE RIVER

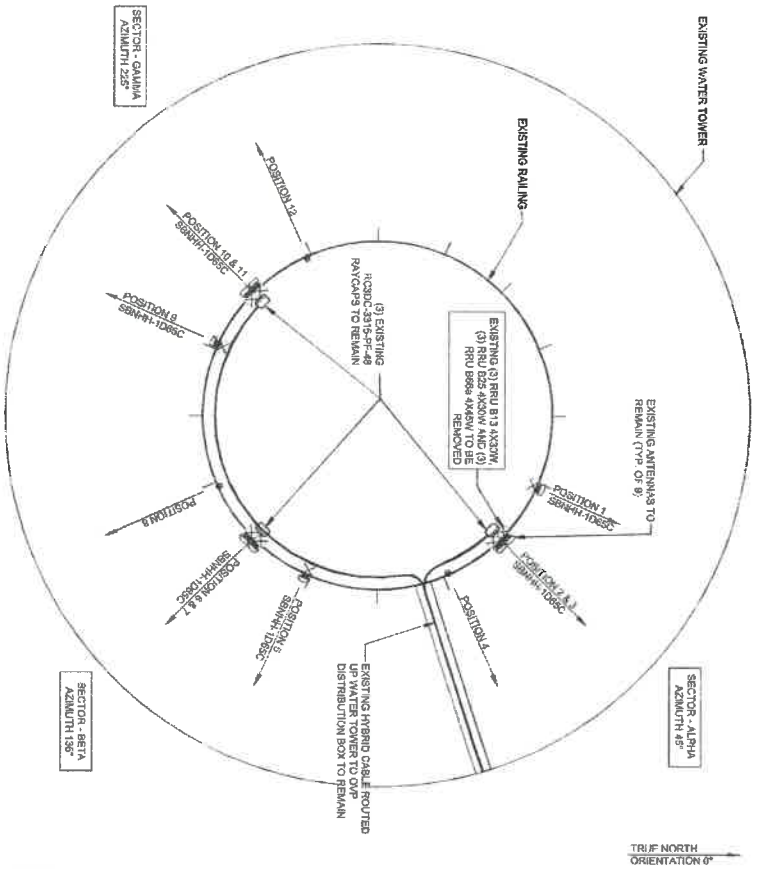
NO.	DESCRIPTION	DATE	BY
A	ISSUED FOR REVIEW	11/05/16	MT
0	ISSUED FOR FINAL	12/10/16	MT



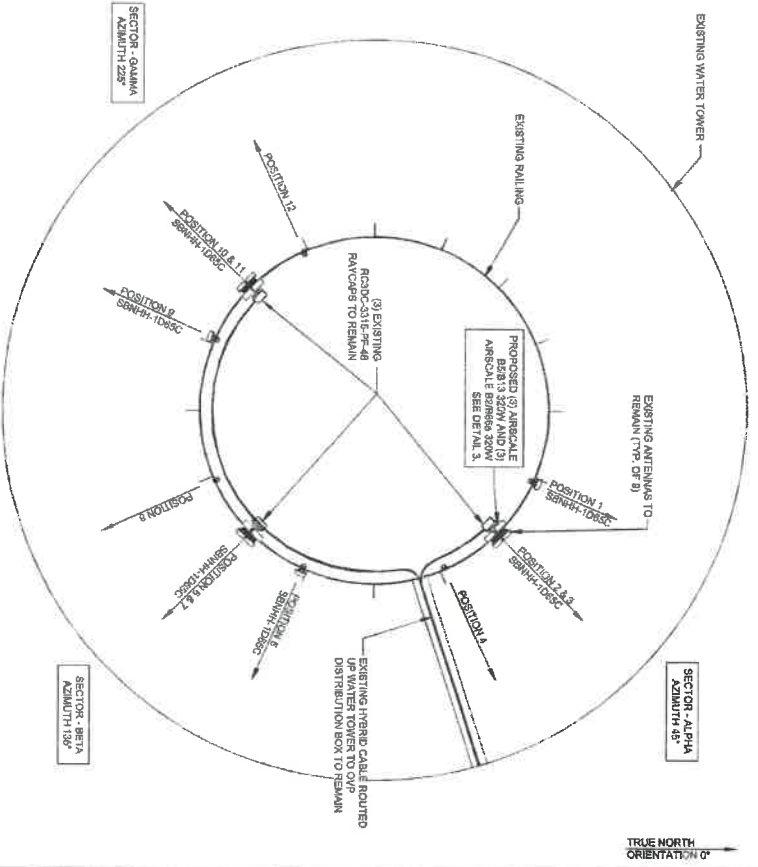
880 VOOKE STREET
 NAPOLEON, OH
 DRAWN BY: MT
 CHECKED BY: JH
 DATE: 11/18
 PROJECT #: 48-889

SHEET TITLE
 TOWER ELEVATION
 & ANTENNA LAYOUTS

SHEET NUMBER
ANT-1



4 EXISTING ANTENNA LAYOUT
N.T.S.



5 PROPOSED ANTENNA LAYOUT
N.T.S.

NO.	DESCRIPTION	DATE	BY
A	ISSUED FOR REVIEW	11/05/18	MT
B	ISSUED FOR FINAL	12/10/18	MT

TERRA
 2150 WICKY FIELDS AV. SUITE 200
 KENNESAW, OH 44242
 PH (330) 754-8100



387095
MAUMEE RIVER
 830 VOCKER STREET
 WAINFORD, OH
 DRAWN BY: MT
 CHECKED BY: JB
 DATE: 11/1/18
 PROJECT: 42-289

SHEET TITLE
TOWER ELEVATION & ANTENNA LAYOUTS

SHEET NUMBER
ANT-2



November 26, 2018

Amy Sabo
 Verizon Wireless
 18 Abele Road
 Bridgeville, PA 15017

RE: Existing Water Tank Structural Analysis
 Site Location: 850 Vocke Street, Napoleon, OH
 Site Number / Name: 387095 / Maumee River
 Terra Project: 48-589

Dear Amy,

Terra Consulting Group, Ltd. is pleased to submit this structural analysis of the existing water tank structure for the telecommunication equipment additions proposed by Verizon. This analysis is consistent with the 2017 Ohio Building Code, ASCE 7-10 and ANSI AWWA D100-11 for the following criteria:

Table 1 – Wind Loads

Ultimate Wind Speed/Basic Wind Speed without Ice	Basic Wind Speed with Ice & Design Ice Thickness	Risk Category	Exposure Category	Topographic Category	
115/89 MPH (3 second gust)	40 MPH (3 second gust)	1"	IV	C	1

Table 2 – Seismic Loads

Seismic Site Class	Seismic Design Category	Ss	S1
D	C	0.120	0.056

Table 3 – Existing and Proposed Antennas

Mount Elevation	Antenna Centerline Elevation	Quantity	Antenna Model	Status	Cables
168'-0"	175'-0"	9	Andrew SBNHH-1D65C	Existing	(6) 1 5/8" Coax
		3	Airscale B5/B13 320W	Proposed	
		3	Airscale B2/B66a 320W	Proposed	(3) Hybrid
		3	Commscope RXXDC-3315-PF-48	Existing	

The proposed antenna and water tank information was provided by Verizon Wireless. If the antenna loading is different than shown in Table 3 or if the existing conditions in the field vary from the referenced documents, Terra Consulting Group, Ltd. should be notified to analyze the revised conditions.



November 26, 2018
Site Location: 850 Vocke Street, Napoleon, OH
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The tower is 168'-0" tall elevated on eight braced legs. The Verizon antennas are mounted to the corral located on top of the tank.

The analysis was completed with the following assumptions:

1. The equipment sizes, weights and layout are according to the documents provided.
2. The existing water tower structure is in good condition and without structural defects.
3. All bolts were tightened according to AISC requirements.
4. All pipe members are grade A53 Grade B (35 ksi)
5. All other steel members are grade A36 (36 ksi)
6. The mounts, antennas and appurtenances are as listed in Table 2 and the Final Construction Drawings by Terra Consulting Group, Ltd.
7. The original water tank design was performed in accordance with ANSI AWWA D100 and the governing building code.

Our structural analysis indicates the water tank has **adequate** structural capacity to support the proposed equipment listed in Table 3.

Table 4 – Analysis Results

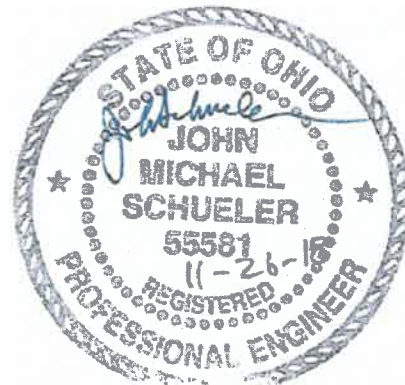
Component	% Capacity	Results
Mount Primary Members	100% *	Adequate
Water Tank	81%	Adequate

*Actual percentage is slightly less than 100% due to slight decrease in loads from previous analysis

If you have any questions or require additional information, please feel free to contact us.

Sincerely,
TERRA CONSULTING GROUP, LTD.

John Schueler, P.E.





November 26, 2018
Site Location: 850 Vocke Street, Napoleon, OH
Site Number / Name: 387095 / Maumee River
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STANDARD CONDITIONS FOR PROVIDING PROFESSIONAL ENGINEERING SERVICES FOR
EXISTING STRUCTURES

1. The Standard of Care for all Professional Engineering Services performed by Terra Consulting Group, Ltd. under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.
2. The structural analysis was performed assuming no physical deterioration has occurred to any of the structural components. No allowance was made for members or bolts that are corroded, damaged, bent, loose or missing. The analysis assumes all bolts are torqued to a snug-tight condition defined by AISC.
3. The structural analysis provided verifies the adequacy of the primary structural members of the mount. Complete and detailed information of every secondary component and connection is not available. A limited scope of service is provided by Terra Consulting Group, Ltd. in that we cannot analyze the capacity of every plate, weld, connection, etc.
4. Any sketches included in this document are a schematic representation of the structure and should not be used to fabricate or order any material.
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7. All services are performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. Terra Consulting Group, Ltd. is not responsible for the conclusions, opinions or recommendations made by others based on the information we supply.



November 26, 2018
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 Site Number / Name: 387095 / Maumee River
 Terra Project: 48-589

Water Tower Wind Load Analysis

Wind Load Calculations (AWWA D100-11)

P_w : Wind Pressure (psf)

C_d : Drag Factor = 1.0 Flat
 = 0.6 Cylindrical
 = 0.5 Double Curve

V : Wind Velocity (100mph)

$$P_w = 30 * C_d * \left(\frac{V}{100}\right)^2$$

$$P_w = 30 * C_d * \left(\frac{100}{100}\right)^2$$

P_w = 30 psf Flat
 = 18 psf Cylindrical
 = 15 psf Double Curve

Table 5: Design Wind Force on Water Tower – Original Design

Member	Area (sf)	Wind (psf)	Wind Load (lb)	Centerline Elevation (ft)	Moment at Base (ft-kips)
Tank	2000	15	30000	145	4350
Horizontal Struts	98	30	2940	70	205.8
Bracing Rods	116	18	2088	70	146.16
Column/Riser	1040	18	18720	65	1216.8
Legs.	3240	18	58320	68	3965.76
Misc	56	30	1680	70	117.6
Total:			113748		10002.12



November 26, 2018
 Site Location: 850 Vocke Street, Napoleon, OH
 Site Number / Name: 387095 / Maumee River
 Terra Project: 48-589

Table 6: Equipment Wind Force on Water Tower

Equipment	Quantity	Area per Item (sf)	Wind (psf)	Wind Load (lb)	Centerline Elevation (ft)	Moment at Base (ft-kips)
SBNHH-1D65C	9	8	30	2160	175	378
Airscale B5/B13 320W	3	1.83	30	164.7	175	28.8225
Airscale B2/B66a 320W	3	1.83	30	164.7	175	28.8225
Commscope RXXDC-3315-PF-48	3	2.8	30	252	175	44.1
Mount Frame	1	70	30	2100	168	352.8
Pipe Mounts	15	3	15	675	175	118.125
Cable Enclosure	2	87	30	5220	84	438.48
Existing Dish/Antennas	6	4	30	720	185	133.2
Other Carrier Antennas/Mounts	15	4.53	30	2038.5	132	269.082
Total:				13494.9		1791.432

Overturning Moment Calculations

M_t = Total overturning moment with a factor of safety of 1.5 (10002+1791)*(1.5) = (17690.3 ft-kips)
 X = Distance from overturning point to the center of weight (39 ft)
 W_R = Weight required to resist overturning moment
 W_T = Total weight of empty water tower with foundations (566 kips)
 – from previous report by Harper Engineering

$$\Sigma M = M_t - W_R * X$$

$$W_T > W_R$$

$W_R = 453.6$ kips

$566 \text{ kips} > 453.6 \text{ kips}$ O.K.
 81%

As shown above, the water tower has **sufficient** weight to resist the overturning moment created by wind forces.

Seismic

The overall equipment weight will decrease from the previous passing structural analysis by Krech Ojard & Associates dated 5-26-17. The weight of the antennas and RRU equipment is insignificant in comparison to the weight of the water in the tank and the lateral seismic forces generated under this condition. Therefore, the proposed equipment changes are acceptable for seismic considerations.

USGS Design Maps Summary Report

User-Specified Input

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 41.3953°N, 84.12056°W

Site Soil Classification Site Class D – "Stiff Soil"

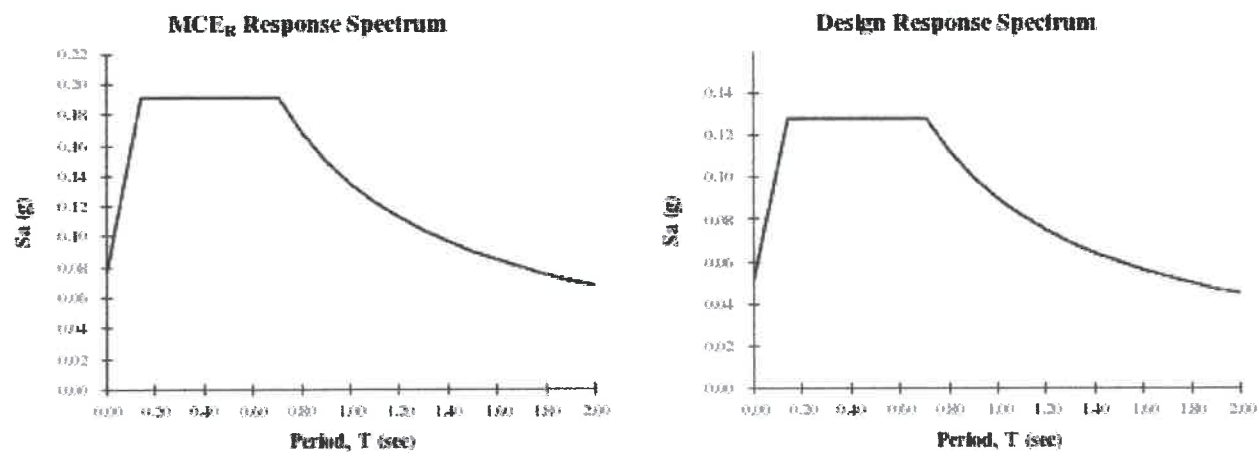
Risk Category IV (e.g. essential facilities)



USGS-Provided Output

$S_s = 0.120$ g $S_{MS} = 0.191$ g $S_{DS} = 0.128$ g
 $S_1 = 0.056$ g $S_{M1} = 0.135$ g $S_{D1} = 0.090$ g

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.



Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.



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JOB Maumee River W1
 DATE Nov 2018
 AUTHOR JS
 PAGE OF

MOUNTING PIPE AND RAIL

- Antennas - No Change
- RRU

- Remove

	WT	Area
(3) B13 4x30W	56	246.6
(3) B25 4x30W	53	254.4
(3) B66a 4x45W	57	304.4
	<u>166</u>	

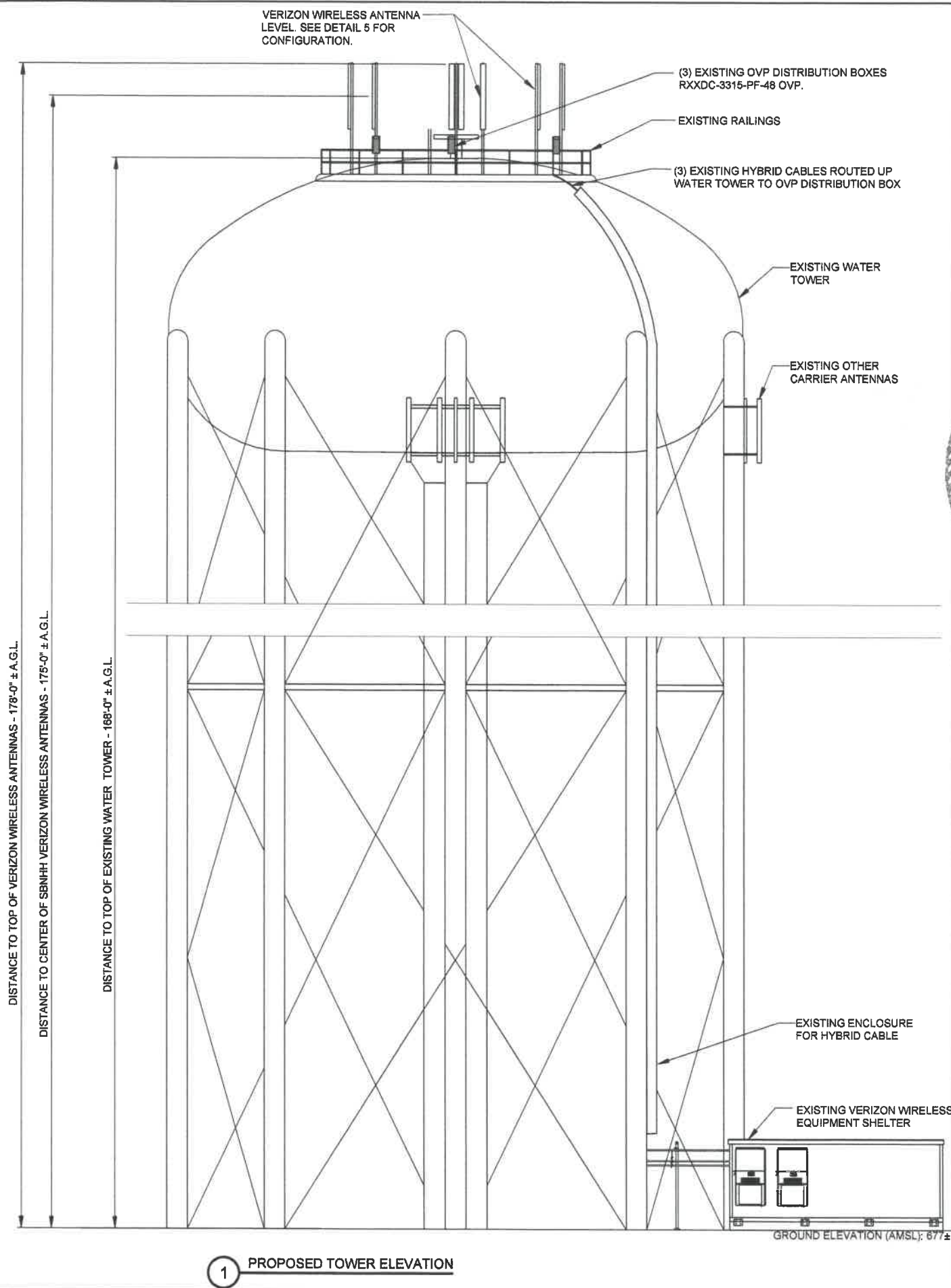
- ADD

(3) B5/B13 320W	73	267.4
(3) B2/B66a 320W	79	267.4
	<u>152</u>	

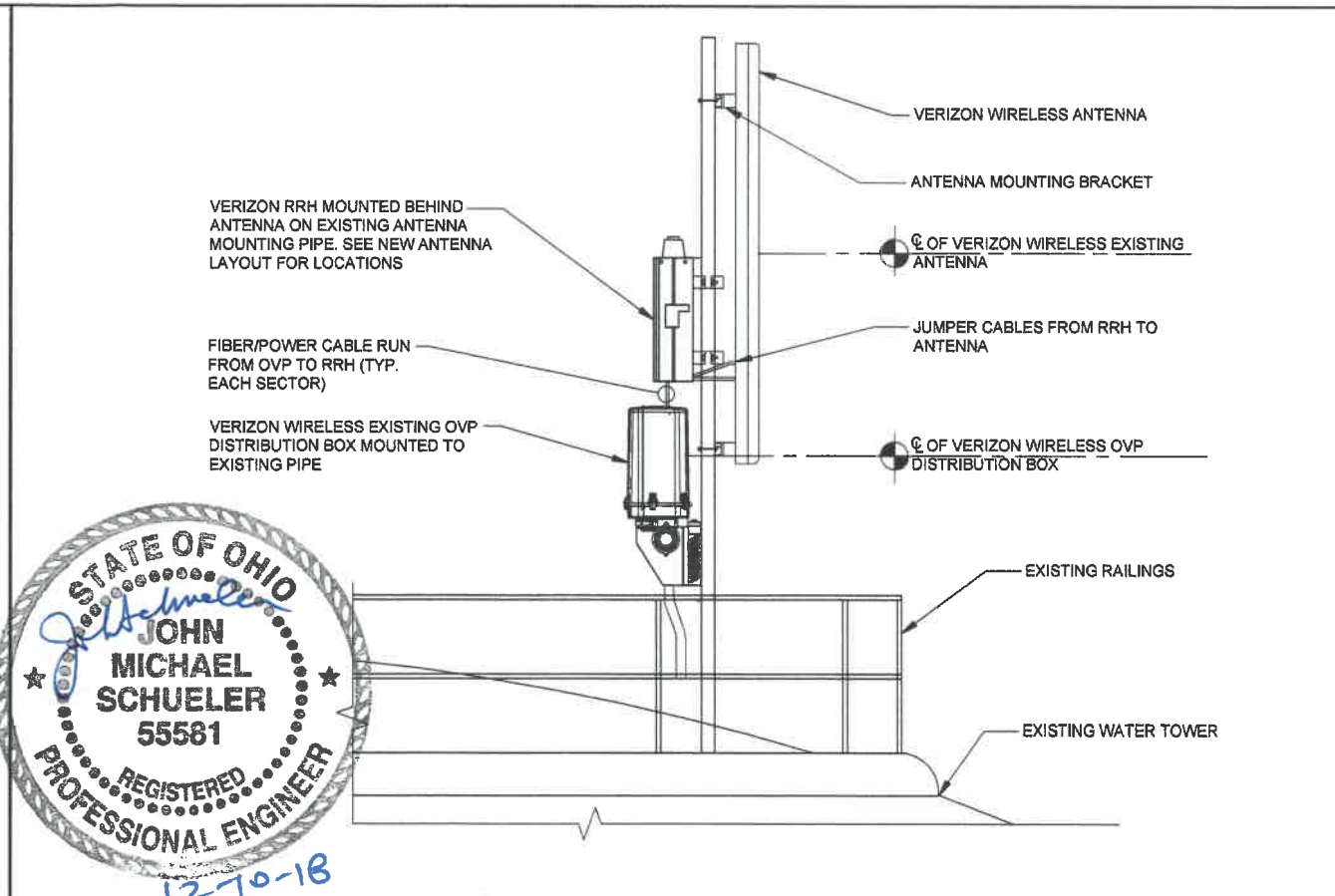
- Overall RRU weight and wind area decreased
- Loads @ side by side antenna - Replace 2 RRU w/ 1 RRU decreased
- Loads @ single antenna location
 $Weight = 79 - 53 = 26$ pound increase
 $Area = 267.4 - 246.6 = 20.8$ in² increase

However, weight and wind area at single antenna location are less than double antenna location.

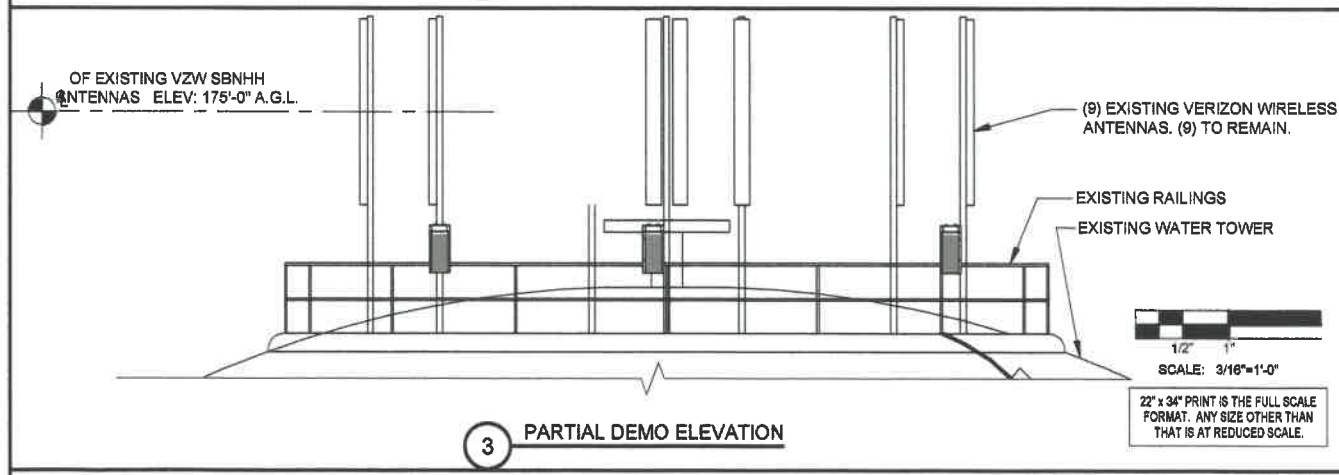
Therefore, mount framing stresses are not higher than previous passing report by Knech Ojard & Associates 5-26-17 and are acceptable.



1 PROPOSED TOWER ELEVATION



2 PROPOSED OVP/RRH/ANTENNA DETAIL
N.T.S.



3 PARTIAL DEMO ELEVATION

SEQUENCE OF OPERATION:

1. REMOVE (3) EXISTING RRU B13 4X30W, (3) RRU B25 4X30W AND (3) B66a 4X45 W
2. INSTALL (3) NEW AIRSCALE B5/B13 320W AND (3) NEW AIRSCALE B2/B66a 320W
3. INSTALL POWERSHIFT FOR DB RRH
4. RETURN ALL REMOVED EQUIPMENT TO VERIZON WIRELESS.

NOTES:

1. THIS DRAWING IS FOR EXHIBIT PURPOSES ONLY
2. PLEASE REFER TO STRUCTURAL REPORT PROVIDED BY OTHERS
3. NO LINE OR ANTENNA WORK TO BEGIN PRIOR TO CONFIRMATION OF ADEQUATE TOWER AND MOUNT CAPACITY USING THE FINAL CONFIGURATION.
4. ALL EXISTING & PROPOSED INFORMATION PROVIDED BY LL AND VERIZON WIRELESS.
5. NO NEW ELECTRICAL WORK BEING DONE AND NO NEW VOLTAGE REQUIRED.

ANTENNA REPLACEMENT NOTES:

1. CONTRACTOR TO INSPECT THE CONDITION OF EXISTING MOUNTING PIPES. CONFIRM THE FOLLOWING:
 - CORROSION; IF MOUNTS ARE FOUND TO BE CORRODED, CONTACT VERIZON REP. FOR DIRECTION.
 - CHECK CONDITION OF ATTACHMENT BOLTS. IF FOUND LOOSE, TIGHTEN TO ORIGINAL SPECIFICATIONS (ALSO, TURN OF THE NUT METHOD).
 - IF BOLTS ARE MISSING, REPLACE TO SUITE.
 - CONFIRM MOUNTING PIPE IS ADEQUATELY SIZE TO ACCOMMODATE PROPOSED ANTENNA INSTALL.
2. ALL WORK DEPICTED ON THIS DRAWING DESIGNED IN ACCORDANCE WITH 2017 OBC AND AMENDMENTS.

LATITUDE: 41° 23' 43.4" N
LONGITUDE: 84° 07' 13.0" W



NO.	DESCRIPTION	BY	DATE
		MT	MT
A	ISSUED FOR REVIEW	MT	11/05/18
D	ISSUED FOR FINAL	MT	12/10/18

387095
MAUMEE RIVER

850 VOCKE STREET
NAPOLEON, OH

DRAWN BY: MT
CHECKED BY: JS
DATE: 11/11/18
PROJECT #: 48-589

SHEET TITLE
TOWER ELEVATION & ANTENNA LAYOUTS

SHEET NUMBER
ANT-1

REVISIONS	
NO.	DESCRIPTION
1	ISSUED FOR REVIEW
2	ISSUED FOR FINAL
3	
4	
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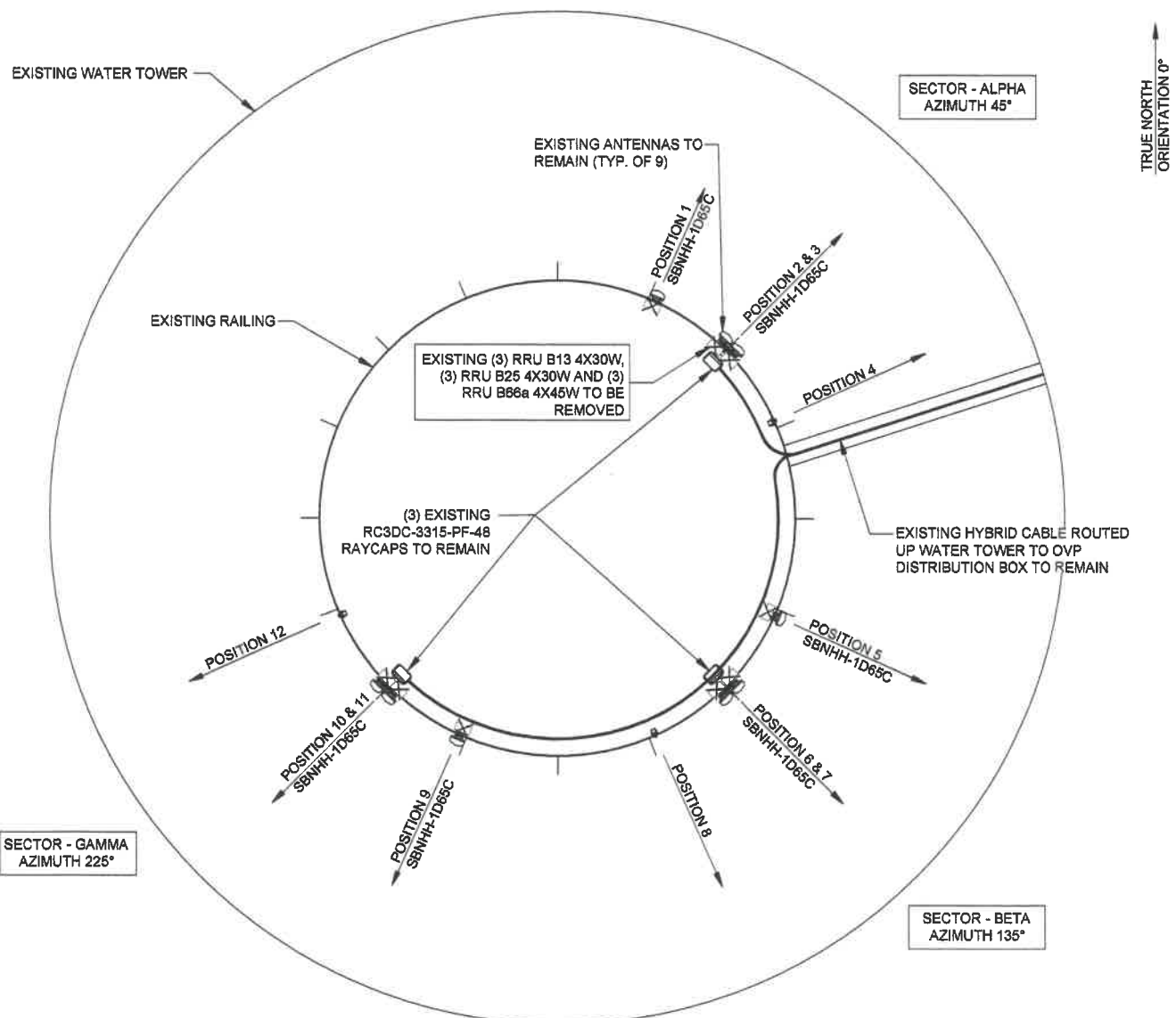
387095
MAUMEE RIVER

850 VOCKE STREET
 NAPOLEON, OH

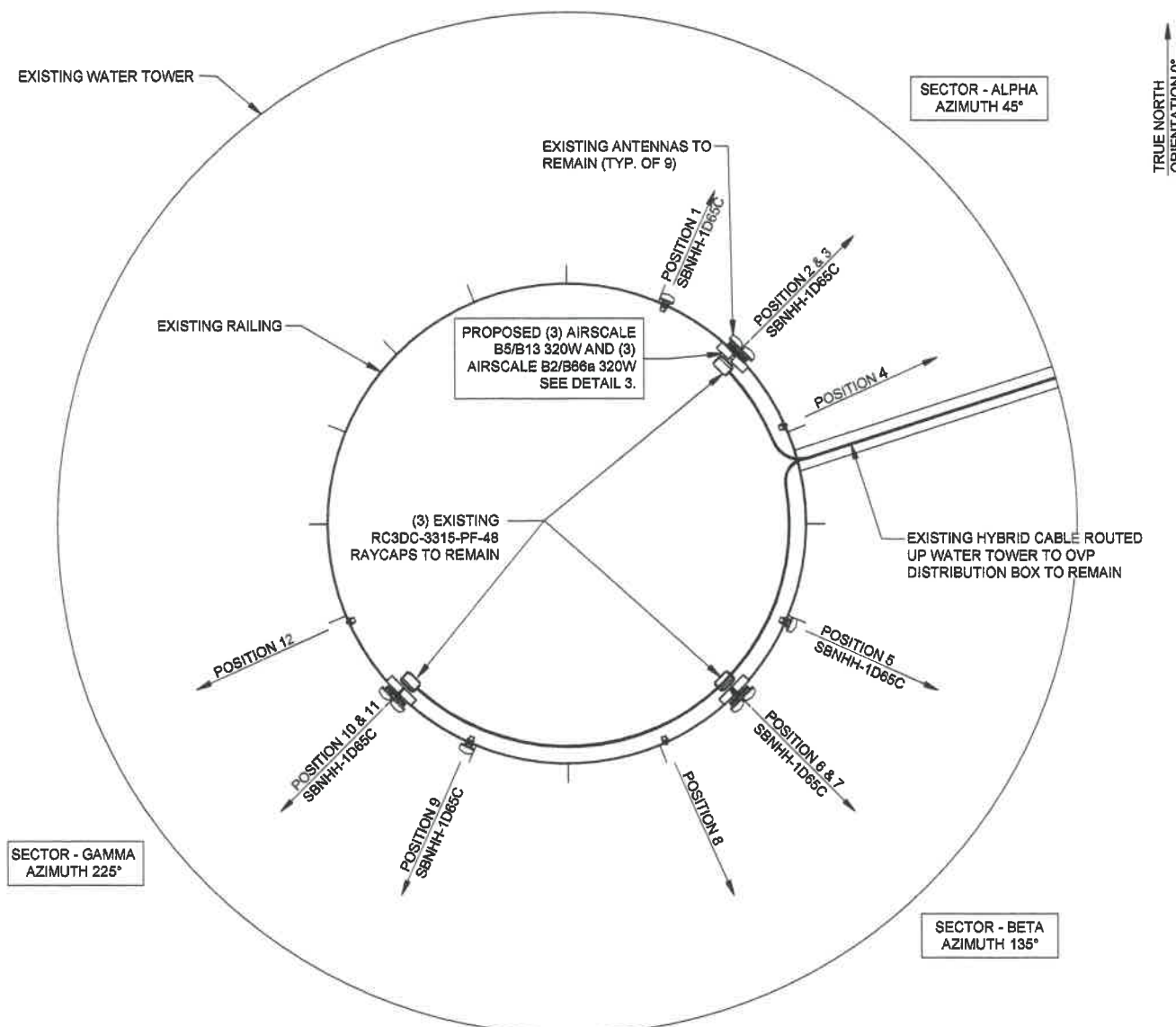
DRAWN BY:	MT
CHECKED BY:	JS
DATE:	11/1/18
PROJECT #:	48-589

SHEET TITLE
TOWER ELEVATION & ANTENNA LAYOUTS

SHEET NUMBER
ANT-2



4 EXISTING ANTENNA LAYOUT
 N.T.S.



5 PROPOSED ANTENNA LAYOUT
 N.T.S.