COUNTY FACILITIES PLANNING
WORK INITIATION REQUEST FORM

Please complete a form for each new proposal review request.

Work Proposal Name:

MPD Communication Infrastucture 7401 W Puetz Road

Date of Request:

6/11/24

Requesting Department:

CRC

Department Contact Name:

Erica Goblet

Approval Signature of Department Head:

High Org: 430 **Low Org:**

DESCRIPTION

Please provide a detailed description of the request:

The City of Milwaukee needs to update its radio communication facilities at the water tower located at 7401 West Puetz Road, Franklin, WI. The City currently has a license agreement with the City of Franklin for the tower itself, but recently found out from Franklin that the County owns the actual land that the tower sits on. To move forward with all of the City of Milwaukee's planned expansion and updating, we need the County's approval and signature on the attached document.

On the County's land, which the City of Franklin has an easement for, the City would like to add a standalone Public Safety Communications Shelter and generator approximately 75 feet from the water tower in the Southwestern corner of the property. This is allowable under the easement with the County's approval.

How will this proposal improve your operations, enhance customer service or otherwise benefit your department and the County?

Updated communications for law enforcement is a benefit to the community.

How does this proposal align with the County's objectives on racial equity?
Please see the County's Vision/Mission/Values and strategic focus areas attached

Working with other governmental entities to ensure services are improved across the community

Desired Timeline:

Begin Date: 7/1/24

End Date:

Duration: Life of equipment

Anticipated Funding Source *(check all that apply and include amount allocated under each category)*:

Operating Budget:

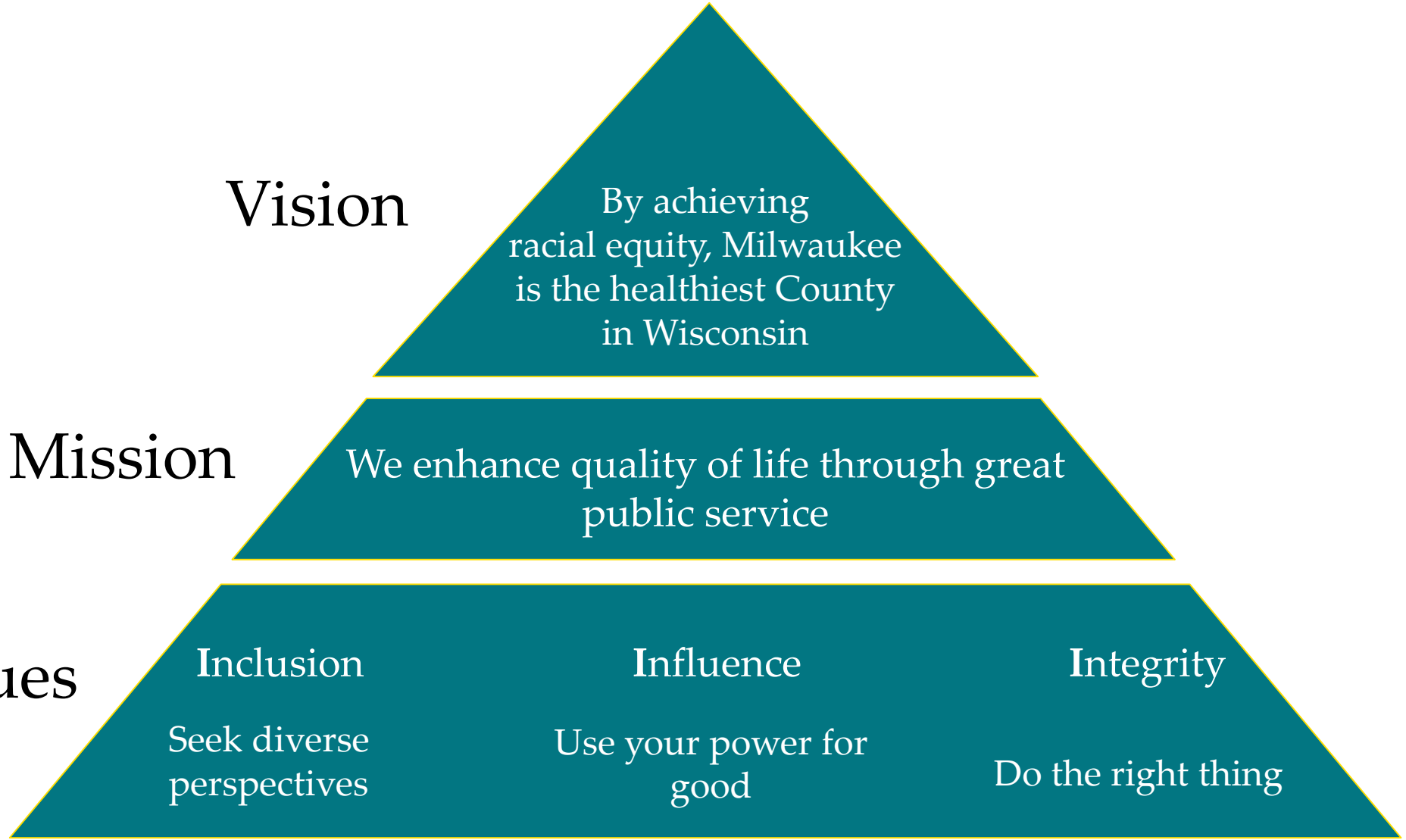
Capital Budget:

Other *(i.e. grants, donations, etc.; please describe)*:

Request Involves:

Parks Property **BHD Property**

The Basics



Strategic Focus Areas

1. Create Intentional Inclusion

- 1A: Reflect the full diversity of the County at every level of County government
- 1B: Create and nurture an inclusive culture across the County government
- 1C: Increase the number of County contracts awarded to minority and women-owned businesses

2. Bridge the Gap

- 2A: Determine what, where and how we deliver services based on the resolution of health disparities
- 2B: Break down silos across County government to maximize access to and quality of services offered
- 2C: Apply a racial equity lens to all decisions

3. Invest in Equity

- 3A: Invest "upstream" to address root causes of health disparities
- 3B: Enhance the County's fiscal health and sustainability
- 3C: Dismantle barriers to diverse and inclusive communities

COUNTY FACILITIES PLANNING
WORK INITIATION REQUEST DETERMINATION

CFPSC ACTION
FOR CFPSC USE ONLY

CFPSC Project Tracking #:
2024-021

TYPE OF REQUEST (Refer to paragraph 4.3 of the CFPSC charter for more details)

- ☐ **1. Asset Management**
- ☐ **2. Move Management**
- ✔ **3. Facility Improvements**
- ☐ **4. New Footprint**
- ☐ **5. Contractural Obligations**
- ☐ **6. Centralized Facilities Management Process Improvement**

CFPSC Review Comments:

FOR EASEMENTS ONLY

Reviewed & Recommended for Approval:

DAS — FM, AE&ES (Legal Description)

Director, DAS

Corporation Counsel

Note:
1. *Easements affecting lands zoned "Parks" require County Board approval.*
2. *Forward a copy of the recorded easement to AE&ES.*

CFPSC RECOMMENDATION

The County Facilities Planning Steering Committee reviewed this proposal on _____. As evidenced by the authorized signature below, the County Facilities Planning Steering Committee approval of this proposal.

Chair or Vice-Chair:

Date:

County Facilities Planning Steering Committee

Planning Department
9229 West Loomis Road
Franklin, Wisconsin 53132
generalplanning@franklinwi.gov
(414) 425-4024
franklinwi.gov

Franklin WISCONSIN

APPLICATION DATE: _____

STAMP DATE: city use only

ADMINISTRATIVE REVIEW APPLICATION

PROJECT INFORMATION [print legibly]

APPLICANT [FULL LEGAL NAMES]	APPLICANT IS REPRESENTED BY [CONTACT PERSON]
NAME: Ricky Guidry / Custom Tower LLC	NAME: Rhonda Guidry
COMPANY: Custom Tower LLC	COMPANY: Custom Tower LLC
MAILING ADDRESS: 402 Facile Rd	MAILING ADDRESS: 402 Facile Rd
CITY/STATE: Scott LA ZIP: 70583	CITY/STATE: Scott LA ZIP: 70583
PHONE: 337-303-7810	PHONE: 337-224-7979
EMAIL ADDRESS: Rhonda@customtowerllc.com	EMAIL ADDRESS: Rhonda@customtowerllc.com

PROJECT PROPERTY INFORMATION

PROPERTY ADDRESS: 7401 W Puetz Rd Franklin	TAX KEY NUMBER:
PROPERTY OWNER: City of Franklin	PHONE: 337-414-425-4024
MAILING ADDRESS: 9229 W Loomis Rd	EMAIL ADDRESS:
CITY/STATE: Franklin ZIP: WI	DATE OF COMPLETION: office use only

APPLICATION TYPE

Please check the application type that you are applying for

☐ Home Occupation ☒ Minor Site Plan Amendment

SIGNATURES

The applicant and property owner(s) hereby certify that: (1) all statements and other information submitted as part of this application are true and correct to the best of applicant's and property owner(s)' knowledge; (2) the applicant and property owner(s) has/have read and understand all information in this application; and (3) the applicant and property owner(s) agree that any approvals based on representations made by them in this Application and its submittal, and any subsequently issued building permits or other type of permits, may be revoked without notice if there is a breach of such representation(s) or any condition(s) of approval. By execution of this application, the property owner(s) authorize the City of Franklin and/or its agents to enter upon the subject property(ies) between the hours of 7:00 a.m. and 7:00 p.m. daily for the purpose of inspection while the application is under review. The property owner(s) grant this authorization even if the property has been posted against trespassing pursuant to Wis. Stat. §943.13.

(The applicant's signature must be from a Managing Member if the business is an LLC, or from the President or Vice President if the business is a corporation. A signed applicant's authorization letter may be provided in lieu of the applicant's signature below, and a signed property owner's authorization letter may be provided in lieu of the property owner's signature[s] below. If more than one, all of the owners of the property must sign this Application).

☒ I, the applicant, certify that I have read the following page detailing the requirements for Administrative review approval and submittals and understand that incomplete applications and submittals cannot be reviewed.

PROPERTY OWNER SIGNATURE:	APPLICANT SIGNATURE: Ricky Guidry 5/16/24
NAME & TITLE: DATE:	NAME & TITLE: Ricky Guidry / Member DATE:
PROPERTY OWNER SIGNATURE:	APPLICANT REPRESENTATIVE SIGNATURE: Rhonda Guidry
NAME & TITLE: DATE:	NAME & TITLE: Rhonda Guidry / Asst DATE: 5/16/24

"Exhibit A"

West Puetz Road

(80' R.O.W.)

N 53°02'26" W
27.74'

33.17'
Rad.=681.78'
Chd.=33.17'
Brg.=N 54°24'17" W

N 35°05'11" E
79.04'

N 08°58'37" W
43.14'

S 53°02'26" E
30.00'

N 35°05'11" E
109.06'

S 35°05'11" W
109.06'

GRAPHIC SCALE
40 0 20 40
(IN FEET)
1 inch = 40 ft.

N 35°05'11" E
236.85'

S 53°02'26" E
230.12'

S 53°02'26" E
60.05'

S 35°05'11" W
188.98'

N 00°28'41" W
108.76'

N 53°02'26" W
105.34'

N 86°13'11" W
110.59'

N 39°59'57" W
153.02'

Detail
Proposed
Building & Slab

19'-6"
10'-0"
10'-0"
13'-0"

Prop.
Slab
749.0'

Scale
1"=20'

Prop.
Slab
749.0'

Proposed finished yard, 1st floor or top of foundation grade shown on this drawing is a suggested grade and should be verified by the owner, builder or municipality

Existing Building
asphalt pavement
concrete
10.84'
11.99'
elec. trans.
752.79 MAG
752.81
751.48 BOC
751.38 BOC
Conc. Curb
748.79 CB
748.44 MAG
748.46
748.62 CB
asphalt pavement
elec. trans.
749.70 EL
749.57 EL
748.72 TL
749.70 MAG
749.66 EL
749.10 EL
747.54 TL
749.47 BOC
749.78 BOC
749.70 MAG
19.5'
748.83 EL
747.78 STK
747.72 TL
749.66 BOC
748.75 STK
12" tree
749.52 BOC
749.96 1
749.71 EL
750.16 SLAB
750.16 2
749.50 EC
749.48 EC
748.69 STK
748.59 EL
748.16 STK
Existing Water Tower
concrete base
749.46 EC
749.44 EC
748.82 EL
749.44 EL
747.50 TL
748.00 EL
747.72 EL
747.15 PF
747.18 TL
747.37 PF
747.00 PF
747.15 PF
745.87 EL
746.69 PF
746.34 EL
746.68 TL
746.98 PF
tree line
(see detail)
Proposed
Building & Slab

749
748
747
746

WISCONSIN
DENNIS C. SAUER
S-2421
Franklin, WI
LAND SURVEYOR

June 3, 2024

Exhibit "A" Referenced to
September 19, 2011
Kaempfer & Associates Inc.

METROPOLITAN SURVEY SERVICE, INC.

PROFESSIONAL LAND SURVEYORS
8482 South 76th Street
Franklin, Wisconsin 53132
PH. (414) 529-5380
survey@metropolitansurvey.com
www.metropolitansurvey.com

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

February 28, 2024

Tank Comparative Analysis Report

Tank Owner:	City of Milwaukee
Carrier:	Milwaukee Police
Carrier:	L3 Harris
Tower Designation:	
Site Name:	Franklin Water Tank
Site ID:	WFT
Site Data:	7402 West Puetz Road, Franklin, Milwaukee County, WI 53132 Latitude *42° 53' 08.63"*, Longitude *-88° 00' 26.59"* 165 Foot – Water Tank
Tectonic Project Number:	12228.10

Tectonic Engineering & Surveying Consultants P.C. is pleased to submit this **"Tank Comparative Analysis Report"** to determine the structural integrity of the above-mentioned water tank structure.

The purpose of the analysis is to determine acceptability the existing water tank structure to accommodate the proposed installation. Based on our analysis we have determined the stress levels to be:

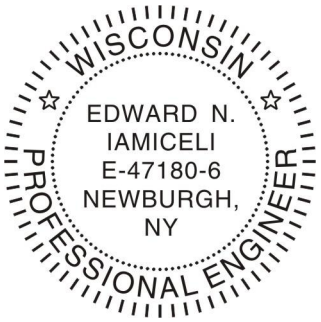
Structure: **Sufficient**

This analysis has been performed in accordance with AWWA D100-11 Standard and ASCE 7-05 based upon a nominal 3-second gust wind of 90 mph. Exposure Category C with an importance factor of 1.15 were used in this analysis.

We at Tectonic appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: Mahesh Chillarge / VR

Respectfully submitted by:
Tectonic Engineering & Surveying Consultants P.C.



Edward Iamiceli, P.E.
Managing Director-Structural

Project Contact Info

1279 Route 300 | Newburgh, NY 12550
845.567.6656 Tel | 845.567.8703 Fax

tectonicengineering.com
Equal Opportunity Employer

TABLE OF CONTENTS

1) INTRODUCTION

Comparative analysis of the existing water tank structure due to the loading of the existing and proposed antenna, equipment, and related appurtenances.

2) ANALYSIS CRITERIA

AWWA Revision: D100-11
Importance Factor: 1.15
Wind Speed: 90 mph
Exposure Category: C
Topographic Factor: 1.0

Table 1 - Proposed Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
167.0	Milwaukee Police	2	sinclair	SC499-HWBLDF (D00-NUFP)	1	1-5/8	1
		1	Combilent	TTA System	1	7/8	
		1	andrew	VHLP3-11W	1	1/2	
		1	-	Pipe 4” STD Mount Pipe	1	CNT-400	

Note:
1) Proposed equipment to be installed on the existing mount.

Table 2 - Existing Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
170.0	unknown	1	unknown	7-Element 2.5 ft Yagi	1	3/8	1
167.0	Milwaukee Police	2	unknown	10 ft omni	1	1-5/8	2
		1	TXRX	TTA system	1	7/8	
		1	unknown	32” Grid Parabolic Dish	1	1/4	1
30.0	unknown	1	unknown	9-Element 2 ft Yagi	1	3/8	1
15.5	unknown	1	unknown	5-Element 2.5 ft Yagi	1	3/8	1

Notes:
1) Existing Equipment.
2) Existing Equipment to be removed; not considered in the analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Dated
Tower Mapping Report	Delta Oaks Group	11/09/23
Site Loading Configuration (Rev 12)	L3 Harris	01/09/24

3.1) Analysis Method

A tool internally developed, using Microsoft Excel, was used to calculate loading on all equipment, appurtenances, and members for various load cases. Selected input from the analysis is included in Appendix A.

3.2) Assumptions

1) All water tank structural elements were properly fabricated, installed, and maintained in good condition in accordance with its original design, AWWA standards, and/or manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2.
3) The wind areas and weights for some appurtenances have been estimated.

This analysis may be affected if any assumptions are not valid or have been made in error. Tectonic should be notified to determine the effect on the structural integrity of the water tank structure.

4) ANALYSIS RESULTS

Based on our analysis, the percentage increase in the lateral force and the moment at the base is minimal. As such, no additional investigation needed.

Table 4 – Water Tank Adequacy

Notes	Component	Capacity (%)	Pass / Fail
1	Water Tank	Sufficient	Pass

Note:
1) See additional documentation in "Appendix A" for calculations supporting the % capacity utilized.

4.1) Results / Conclusions

The existing water tank has sufficient capacity to support the proposed load configurations. No modification is required at this time.

APPENDIX A

TANK COMPARATIVE ANALYSIS

AWWA STANDARD - Appurtenance Loading

Wind Velocity, V:	90	mph	Exposure Category:	C	(AWWA Sec 3.1.4.2)
Force Coefficient, Cf (Flat Surface) :	1		Gust Effect Factor, G:	1.00	(AWWA Sec 3.1.4)
Force Coefficient, Cf (Cylindrical Surface):	0.6		Importance Factor, I:	1.15	(AWWA Sec 3.1.4)
Force Coefficient, Cf (Double Curved):	0.5				

Antenna Loads

Antennas	Quantity	Length or Diameter (in)	Width (in)	Depth (in)	Shape	Weight (ea, lb)	Total Weight (total, lb)	Elevation (ft)	Kz (Per Table 3)	qz (psf)	Wind Pressure (psf)	Projected Area (ea, ft^2)	Net Wind Load (ea, lb)	Total Wind Load (total, lb)	Moment (kip-ft)
Existing/Proposed															
(R) 10 ft x 3" Dia Omni (Normal)	1	120.00	3.00	3.00	C	25.0	25	175.0	1.420	33.86	20.32	2.50	51	51	9
(R) 10 ft x 3" Dia Omni (Normal)	1	120.00	3.00	3.00	C	25.0	25	175.0	1.420	33.86	20.32	2.50	51	51	9
(R) TX RX system (15"x15"x1") (Normal)	1	15.00	15.00	3.00	F	15.0	15	170.0	1.412	33.67	33.67	1.56	53	53	9
(P) SC499-HWBLDF Omni (Normal)	1	140.50	5.00	5.00	C	51.0	51	176.0	1.422	33.90	20.34	4.88	99	99	17
(P) SC499-HWBLDF Omni (Normal)	1	140.50	5.00	5.00	C	51.0	51	176.0	1.422	33.90	20.34	4.88	99	99	17
(P) TTA system (Normal)	1	12.50	4.00	4.00	F	12.0	12	170.0	1.412	33.67	33.67	0.35	12	12	2
(P) VHLP3-11W MW Dish (Normal)	1	36.00	36.00	15.00	F	38.0	38	172.0	1.415	33.75	33.75	9.00	304	304	52
(E) 2.5 FT MW Dish (Normal)	1	32.00	23.00	6.00	F	50.0	50	172.0	1.415	33.75	33.75	5.11	172	172	30
(E) FAA L-810 (OL2) (Normal)	1	9.00	9.00	9.00	F	25.0	25	171.0	1.414	33.71	33.71	0.56	19	19	3
(E) 7 Element 34" Yagi (Normal)	1	34.00	10.00	2.00	F	15.0	15	170.0	1.412	33.67	33.67	2.36	80	80	14
(E) 9 Element 24" Yagi (Normal)	1	24.00	10.00	2.00	F	10.0	10	30.0	1.090	25.99	25.99	1.67	43	43	1
(E) 5 Element 30" Yagi (Normal)	1	30.00	10.00	2.00	F	25.0	25	15.5	1.090	25.99	25.99	2.08	54	54	1
							190					**Exist Total**		**523**	**75**
(E) Existing Antennas							**277**					**Exist + Prop Total**		**882**	**138**

(R) To be Removed Antennas
(P) Proposed Antennas

Cable Loads

Cables	Quantity	Quantity in Wind	Cable Diameter (in)	Shape	Cable Length (ft)	CL Elevation (ft)	Projected Area (ft^2)	Weight (ea, lb/ft)	Kz (Per Table 3)	qz (psf)	Wind Pressure (psf)	Total Weight (ea, lbs)	Wind Load (total, lbs)	Moment (kip-ft)
(R) 1-5/8" Coax Cables	2	0	1.625	C	170.0	85	0.00	0.82	1.216	29.00	17.40	278.80	0.00	0.00
(R) 7/8" Cable	1	0	0.875	C	170.0	85	0.00	0.50	1.216	29.00	17.40	85.00	0.00	0.00
(R) 1/4" Cable	1	0	0.25	C	170.0	85	0.00	0.25	1.216	29.00	17.40	42.50	0.00	0.00
(E) 1-1/4" Cable	4	0	1.25	C	170.0	85	0.00	0.75	1.216	29.00	17.40	510.00	0.00	0.00
(E) 3/8" Coax Cable	1	0	0.375	C	170.0	85	0.00	0.35	1.216	29.00	17.40	59.50	0.00	0.00
(E) 3/8" Coax Cable	2	0	0.375	C	30.0	15	0.00	0.35	1.090	25.99	15.60	21.00	0.00	0.00
(P) 1-5/8" Coax Cable	1	0	1.625	C	170.0	85	0.00	0.82	1.216	29.00	17.40	139.40	0.00	0.00
(P) 7/8" Coax Cable	1	0	0.875	C	170.0	85	0.00	0.50	1.216	29.00	17.40	85.00	0.00	0.00
(P) 1/2" Coax Cable	1	0	0.5	C	170.0	85	0.00	0.38	1.216	29.00	17.40	63.75	0.00	0.00
(P) CNT-400 Coax Cable	1	0	0.4	C	170.0	85	0.00	0.10	1.216	29.00	17.40	17.00	0.00	0.00
										Exist Total		**997**	**0**	**0**
										Exist + Prop Total		**896**	**0**	**0**

AWWA STANDARD - Antenna Mount Loading

Wind Velocity, V:	90	Exposure Category:	C	(AWWA Sec 3.1.4.2)
Force Coefficient, Cf (Flat Surface) :	1	Gust Effect Factor, G:	1.00	(AWWA Sec 3.1.4)
Force Coefficient, Cf (Cylindrical Surface):	0.6	Importance Factor, I:	1.15	(AWWA Sec 3.1.4)
Force Coefficient, Cf (Double Curved):	0.5			

Mount Elements	Quantity	Length or Diameter (in)	Width (in)	Depth (in)	Shape	Weight (ea, lb)	Total Weight (total, lb)	Elevation (ft)	Kz (Per Table 3)	qz (psf)	Wind Pressure (psf)	Projected Area (ea, ft^2)	Net Wind Load (ea, lb)	Total Wind Load (total, lb)	Moment (kip-ft)
(E) Mount Pipe_2.0" STD	5	48.00	2.40	2.40	C	15.64	78	170.0	1.412	33.67	20.20	0.80	16	81	14
(P) Mount Pipe_4.0" STD"	1	72.00	4.50	4.50	C	64.80	65	170.0	1.412	33.67	20.20	2.25	45	45	8
Misc (Add 10%)							14							13	2
							93					**Exist Total**		93	16
(E) Existing Mount Element							157					**Exist + Prop Total**		139	24
(P) Proposed Mount Element															
GUARD RAIL															
Post L3x3x1/4	12	60.00	3.00	3.00	F	24.50	294	170.0	1.412	33.67	33.67	1.25	42	379	64
Horiz_L3x3x1/4	36	68.00	3.00	3.00	F	27.77	1000	170.0	1.412	33.67	33.67	1.42	48	1288	219
Toe Plate_4x1/4	12	68.00	4.00	0.25	F	19.28	231	170.0	1.412	33.67	33.67	1.00	34	303	52
Kicker_L3x3x1/4	12	60.00	3.00	3.00	F	24.50	294	170.0	1.412	33.67	33.67	2.00	67	606	103
Misc (Add 5%)														19	3
							1819						**Total**	2595	441

0.75 Reduction (Mount Orientation)

AWWA STANDARD - Tank Loading

Tank Loads

Wind Velocity, V:	90	mph	**Exposure Category:**	C	(AWWA Sec 3.1.4.2)
Force Coefficient, Cf (Flat Surface) :	1		**Gust Effect Factor, G:**	1	(AWWA Sec 3.1.4)
Force Coefficient, Cf (Cylindrical Surface):	0.6		**Importance Factor, I:**	1.15	(AWWA Sec 3.1.4)
Force Coefficient, Cf (Double Curved):	0.5				

Tank Loads

Tank Elements	Length or Diameter (ft)	Width (ft)	Depth (ft)	Shape	Area (ft^2)	C/L Elevation (ft)	Velocity Exposure Coeff, Kz	qz (psf)	Wind Pressure (psf)	Net Wind Load (total, lb)	Moment (kip-ft)
Tank	50.00	96.00	96.00	C	4800.00	140.00	1.36	32.38	19.43	93264	13057
Support Shaft (115' to 94.25')	20.75	70.67	70.67	C	1466.40	104.63	1.28	30.53	18.32	26859	2810
Support Shaft (94.25' to 69.67')	24.58	70.67	70.67	C	1737.07	81.96	1.21	28.74	17.24	29950	2455
Support Shaft (69.67' to 36.33')	33.34	70.67	70.67	C	2356.14	53.00	1.10	26.25	15.75	37109	1967
Support Shaft (36.33' to 19.68')	16.65	70.67	70.67	C	2353.31	28.01	1.09	25.99	15.60	36701	1028
Support Shaft (19.68' to 0')	19.68	70.67	70.67	C	1390.79	9.84	1.09	25.99	15.60	21690	213
5% Misc. (vent, over flow pipe, etc)										12279	2153
										257853	**23683**

	Existing Configuration	Existing + Proposed Configuration
Estimated Lateral Load	3211 lbs	3616 lbs
Estimated Base Moment	532 k-ft	602 k-ft
Therefore,		
% Increase in the lateral Force on the Tank	1.25 %	1.40 %
% Increase in the Moment of the Tank	2.25 %	2.54 %

Total Moment:	**24285**	K-ft
Total Shear:	**261**	Kips
Total Weight:	**200**	Kips

Weight assumes tank empty condition.

1. Based on above, the increase in the lateral load and the moment from the proposed Milwaukee Police upgrade is relatively very small. As such, we expect the tank and its foundation to have adequate capacity to support the proposed installations.

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Date: **February 29, 2024**

Mount Analysis Report

Tower Owner:	City of Milwaukee
Carrier:	Milwaukee Police
Client:	L3 Harris
Tower Designation:	
Site Name:	Franklin Water Tank
Site ID:	WFT
Site Data:	7402 West Puetz Road, Franklin, Milwaukee County, WI 53132 Latitude *42° 53' 08.63"*, Longitude *-88° 00' 26.59"* Antenna Mount on Water Tank
Tectonic Project Number:	12228.10

Tectonic Engineering & Surveying Consultants P.C. is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of the above-mentioned mount.

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

Structure: **Sufficient**

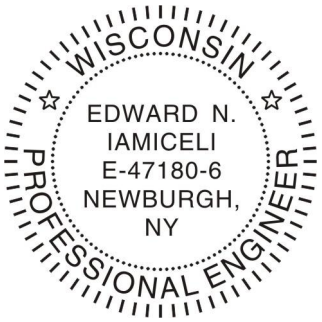
The analysis has been performed in accordance with the TIA-222-G "Structural Standard for Antenna Supporting Structures and Antennas" based upon a wind speed of 93 mph 3-second gust, Structure class 3, exposure category C with a maximum topographic factor, Kzt, of 1.0.

All modifications and equipment proposed in this report shall be installed in accordance with drawing for the determined available structural capacity to be effective.

We at Tectonic appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by / Reviewed by: Mahesh Chillarge / VR

Respectfully submitted by:
Tectonic Engineering & Surveying Consultants P.C.



Edward Iamiceli, P.E.
Managing Director-Structural

Project Contact Info

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TABLE OF CONTENTS

1) INTRODUCTION

The evaluation of the Existing guard rail with antenna mounts and their ability to support the proposed load configurations.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	III
Wind Speed:	93 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	0.75 in
Wind Speed with Ice:	40 mph

Table 1 - Proposed Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
167.0	Milwaukee Police	2	sinclair	SC499-HWBLDF (D00-NUFP)	1	1-5/8	1
		1	Combilent	TTA System	1	7/8	
		1	andrew	VHLP3-11W	1	1/2	
		1	-	Pipe 4” STD Mount Pipe	1	CNT-400	

Note:
1) Proposed equipment to be installed on the existing mount.

Table 2 - Existing Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
170.0	unknown	1	unknown	7-Element 2.5 ft Yagi	1	3/8	1
167.0	Milwaukee Police	2	unknown	10 ft omni	1	1-5/8	2
		1	TXRX	TTA system	1	7/8	
		1	unknown	32” Grid Parabolic Dish	1	1/4	1
30.0	unknown	1	unknown	9-Element 2 ft Yagi	1	3/8	1
15.5	unknown	1	unknown	5-Element 2.5 ft Yagi	1	3/8	1

Notes:
1) Existing Equipment.
2) Existing Equipment to be removed; not considered in the analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Dated
Tower Mapping Report	Delta Oaks Group	11/09/23
Site Loading Configuration (Rev 12)	L3 Harris	01/09/24

3.1) Analysis Method

A tool internally developed, using Microsoft Excel, was used to calculate wind loading on all appurtenances and mount members. This information was then used in conjunction with another program, RISA-3D, which is a commercially available analysis software package, used to check the

antenna mounting system and calculate member stresses for various loading cases. The selected output from the analysis is included in Appendices B and C.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed, and maintained in good condition in accordance with its original design, TIA Standards, and/or manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.
3) Maintenance loads have not been considered in this analysis. Mounts are to be accessed via the water tank roof top.
4) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
5) Steel grades are as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Tectonic should be notified to determine the effect on the structural integrity of the mount.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Pipe Frame Mount)

Notes	Component	Equipment Centerline (ft)	% Capacity	Pass / Fail
1	Guard Rail	168.0	57	Pass
	Mount Pipe 2.0" STD		20	Pass
	Mount Pipe 4.0" STD		09	Pass
	Kickback		12	Pass
Structure Rating (max from all components) =			**57 %**	

Notes:
1) See additional documentation in Appendix C for calculations supporting the % capacity consumed.

4.1) Result / Conclusions

The proposed mounting pipe supporting MW dish and the existing handrail supporting the Omni antennas and their connection to the tank have adequate capacity to support the proposed load configurations as detailed in this report. Furthermore, the max service level dish deflections are within the limitations of TIA-222-G Annex D.

Contractor shall field verify existing conditions and recommendations as noted on the construction drawings and notify the design engineer of any discrepancies prior to construction. Any further changes to the antenna and/or appurtenance configuration should be reviewed with respect to their effect on structural loads prior to implementation.

APPENDIX A

SOFTWARE INPUT CALCULATIONS

Tectonic	Job No.	12228.10		
	Sheet No.	1	of	4
	Calculated By	MC	Date :	02/29/24
	Checked By	VR	Date :	02/29/24

WIND AND ICE LOADS PER TIA-222-G

W.O.	12228.10
Project Name	Franklin Water Tank
Location	7402 West Puetz Road, Franklin, WI
County	Milwaukee County

Tower Type	WT	Water Tank
Structure Class	3	High hazard or Essential facility
Exposure Category	C	Open terrain
Topo Category	1	Flat or rolling terrain
Height of crest	0	ft

Basic Wind Speed (3-sec gust):		
Without ice	93	mph*
With ice	40	mph
Maintenance	30	mph
Ice thickness	0.75	in

Importance Factor	
Wind only	1.15
Wind with ice	1.00
Ice thickness	1.25
Supporting Data:	
K_e	1.00
K_t	N/A
f	N/A
z_g	900
α	9.5
$K_{z,min}$	0.85
K_d	0.95
G_h	1.00

Height	z (ft)	168
	Kh	N/A
	Kzt	1.00
	Kz	1.41
	Kiz	1.18
Wind Pressure, qz (psf)	No Ice	34.15
	With Ice	5.49
	Service	3.55
(tiz)	Ice Thk	2.21
Appurtenances (qzGh)	No Ice	34.15
	With Ice	5.49
	Service	3.55

*Basic Wind speed converted from ultimate gust wind speed of 120 mph.

Tectonic

Job No.	12228.10		
Sheet No.	2	of	4
Calculated By	MC	Date :	02/29/24
Checked By	VR	Date :	02/29/24

Appurtenance Information

Effective Projected Area for Appurtenance $(EPA)_A=Max((EPA)_N,(EPA)_T)$

$(EPA)_T=\sum(C_aA_A)_T$ | | $(EPA)_N=\sum(C_aA_A)_N$

Reduction Factor = 1

Wind Only Load Combinations

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(Aa)_T$ (ft^2)	Wind ward Side Face $(CaAa)_T$ (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Antenna Weight (lb)	Total Weight (lb)
SC499-HWBLDF Omni	**P**	2	168	11.71	5.00	5.00	Cylindrical	1.2	1.2	4.88	10.54	4.88	10.54	180	180	51.0	102.0
TTA System	**P**	1	168	1.04	4.00	4.00	Flat	1.23	1.23	0.35	0.38	0.35	0.38	13	13	12.0	12.0
FAA L-810	E	1	168	0.75	9.00	9.00	Flat	1.20	1.20	0.56	0.61	0.56	0.61	21	21	25.0	25.0
7 Element Yagi	E	1	168	2.83	10.00	2.00	Flat	1.73	1.24	0.47	0.74	2.36	2.64	90	25	15.0	15.0
Panel 15x15x1	E	2	168	1.25	15.00	1.00	Flat	1.67	1.20	0.10	0.31	1.56	3.38	58	5	25.0	50.0
										$\sum(CaAA)_T$	12.58	$\sum(CaAA)_N$	17.54				204

Note: Appurtenances listed above are to be installed along Handrail

Wind with Ice Load Combinations **Ice Thk=** 2.21 in

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(A_a)_T$ (ft^2)	Windward Side Face $(CaAa)_T$ (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Ice Area for Weight (ft^2)	Ice Weight Alone (lbs)
SC499-HWBLDF Omni	P	2.00	168.00	12.08	9.41	9.41	Cylindrical	0.99	0.99	9.47	16.82	9.47	16.82	46	46	15.3	157.7
TTA System	P	1.00	168.00	1.41	8.41	8.41	Cylindrical	1.20	1.20	0.99	1.07	0.99	1.07	6	6	1.4	14.3
FAA L-810	E	1.00	168.00	1.12	13.41	13.41	Cylindrical	1.20	1.20	1.25	1.35	1.25	1.35	7	7	2.3	23.2
7 Element Yagi	E	1.00	168.00	3.20	14.41	6.41	Cylindrical	1.36	1.21	1.71	2.09	3.84	4.18	23	11	5.7	58.3
Panel 15x15x1	E	2.00	168.00	1.62	19.41	5.41	Cylindrical	1.25	1.20	0.73	1.64	2.62	5.65	16	5	3.3	34.3
										$\sum(CaAA)_T$	22.96	$\sum(CaAA)_N$	29.07				288

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	12228.10		
Sheet No.	3	of	4
Calculated By	MC	Date :	02/29/24
Checked By	VR	Date :	02/29/24

Existing Low Profile Platform

Mount Center Line=	168 ft

Member sizes are based on Mapping Report by Delta Oaks Group, dated 11/16/23.

Reduction Factor = 1

Mount Part	Quantity	Length (ft)	Projected Width (in)	Depth (in)	Flat or Cylindrical ?	Drag Factor	Projected Area (ft^2)	Wind Force (lbs/ft)	Ice Weight Area (ft^2)	Ice Weight (lbs/ft)	Projected Area with Ice (ft^2)	Wind Force Ice (lbs/ft)	Service Wind Force (lbs/ft)
Mount Pipe_2.0" STD	2	4.00	2.40	2.40	Cylindrical	1.2	1.92	7.4	5.02	6.5	5.45	3.4	0.8
Mount Pipe_4.0" STD	2	8.00	4.50	4.50	Cylindrical	1.2	7.20	13.8	18.84	12.1	14.26	4.4	1.4
Horiz_L3x3x1/4"	13	4.75	3.00	3.00	Flat	2	30.88	15.4	61.75	10.3	76.29	6.1	1.6
Post_L3x3x1/4"	14	4.75	3.00	3.00	Flat	2	33.25	15.4	66.50	10.3	82.16	6.1	1.6
Horiz_P4x1/4	12	4.75	4.00	0.25	Flat	2	38.00	20.5	40.38	7.3	79.92	6.9	2.1
Kicker_L3x3x4	6	4.75	3.00	3.00	Flat	2	14.25	15.4	28.50	10.3	35.21	6.1	1.6

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	12228.10		
Sheet No.	4	of	4
Calculated By	MC	Date :	01/28/21
Checked By	VR	Date :	01/28/21

Microwave Dish Calculations :

MW Dish name	(E) or (P)	z (ft)	Azimuth (Deg)	Diameter (ft)	Depth (in)	Weight (lbs)	Type of Mw Dish
VHLP3-11W	P	168	353	38.4	15.2	38	Cylindrical Shroud
2.5 ft Grid Dish	E	168	0	30	23	50	Grid

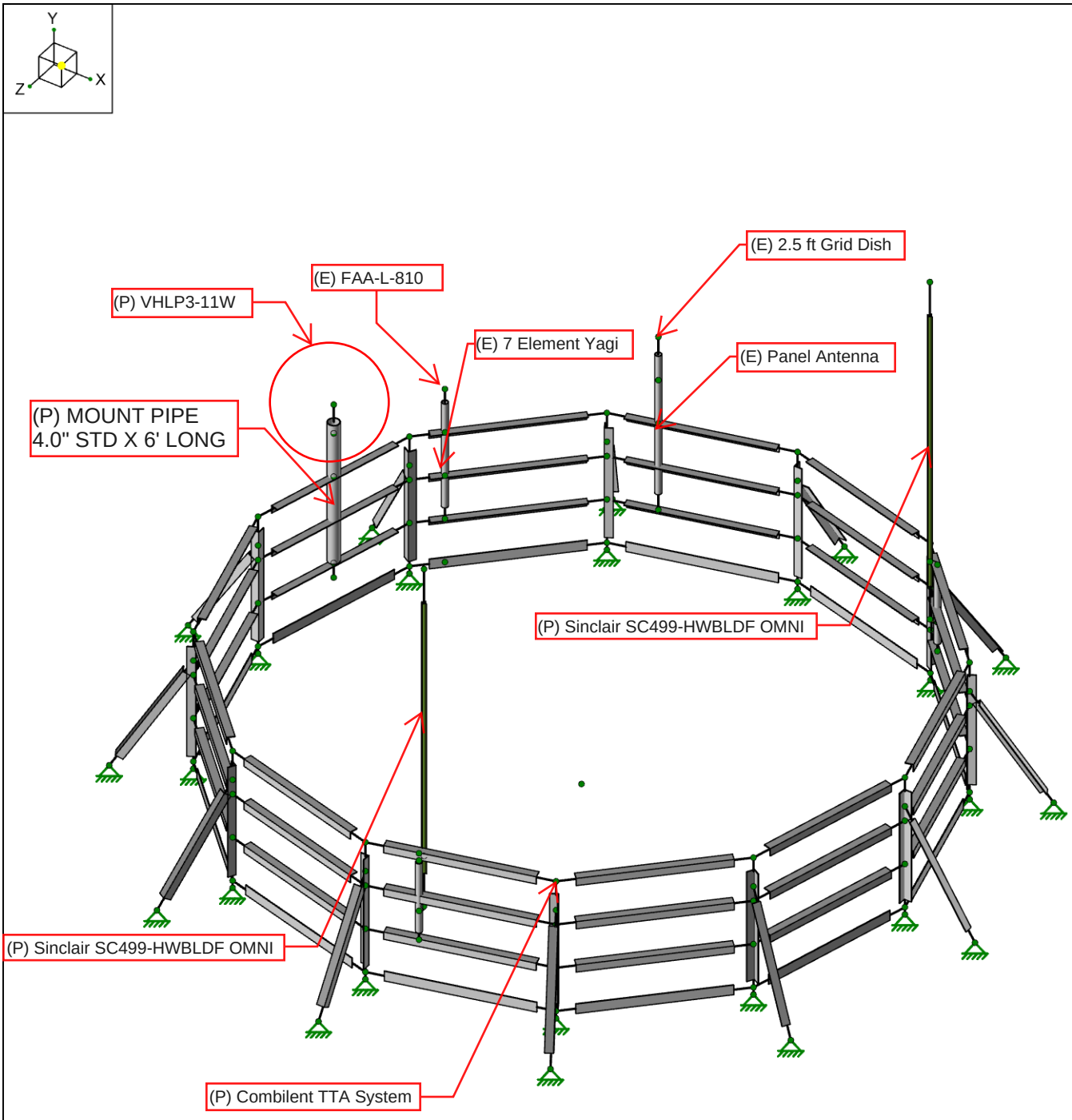
MW Dish Name	Max C_A	Max C_S	Max C_M	C_A	C_S	C_M
VHLP3-11W	1.26	0.63	0.11	1.26	-0.10	0.03
2.5 ft Grid Dish	-0.59	0.29	0.06	0.54	0.00	0.00

MW dish Coeff. based on Max Values

MW Dish Name	Offsets (in)		Force (lbs)		Moments (lbs.ft)		
	Normal	Trans.	Normal	Trans.	Normal	Trans.	Total
VHLP3-11W	16	7	346	87	462	50	100
2.5 ft Grid Dish	0	0	-99	47	0	0	23

APPENDIX B

WIRE FRAME AND RENDERED MODELS



RISA	Tectonic	WFT	SK-1
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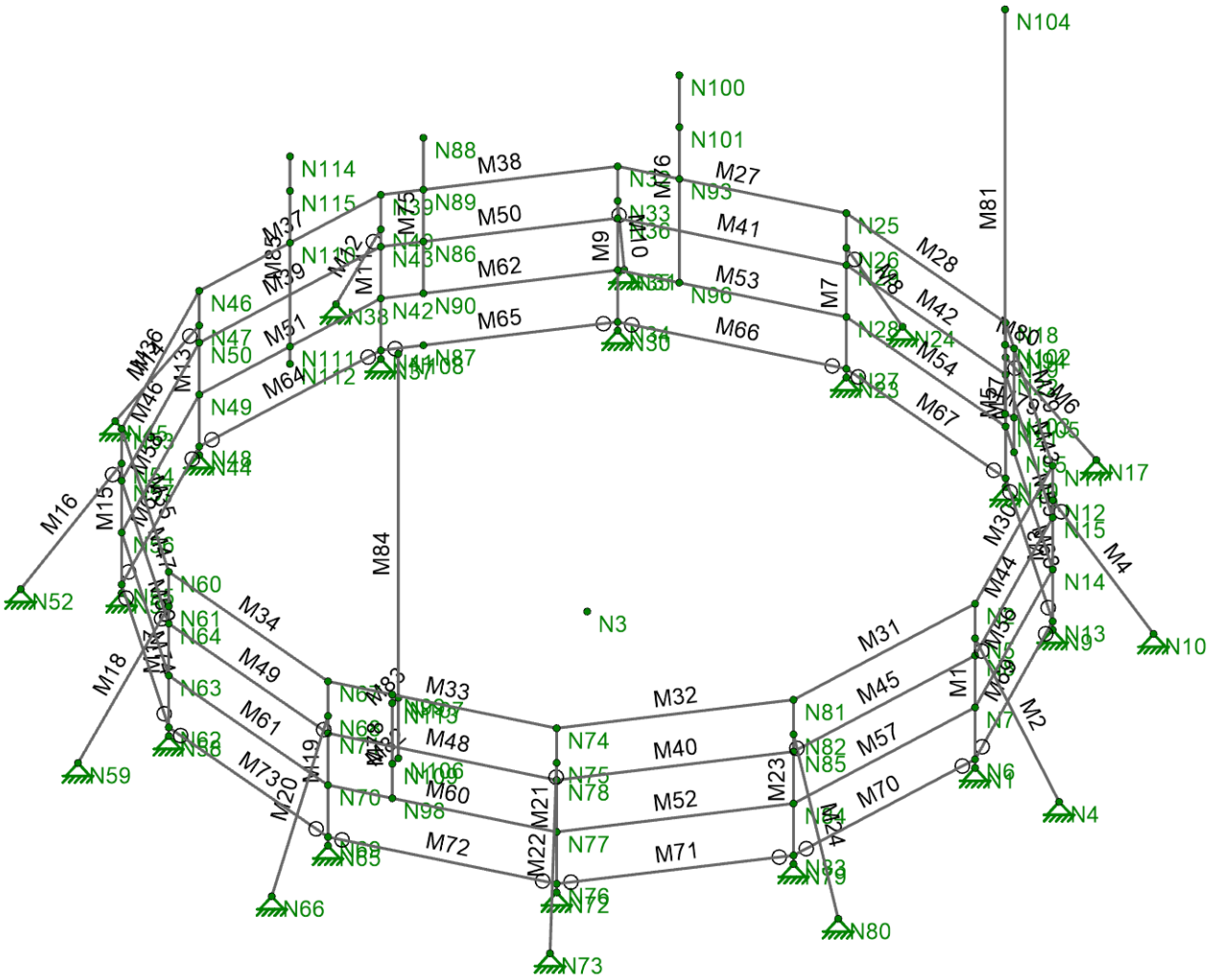

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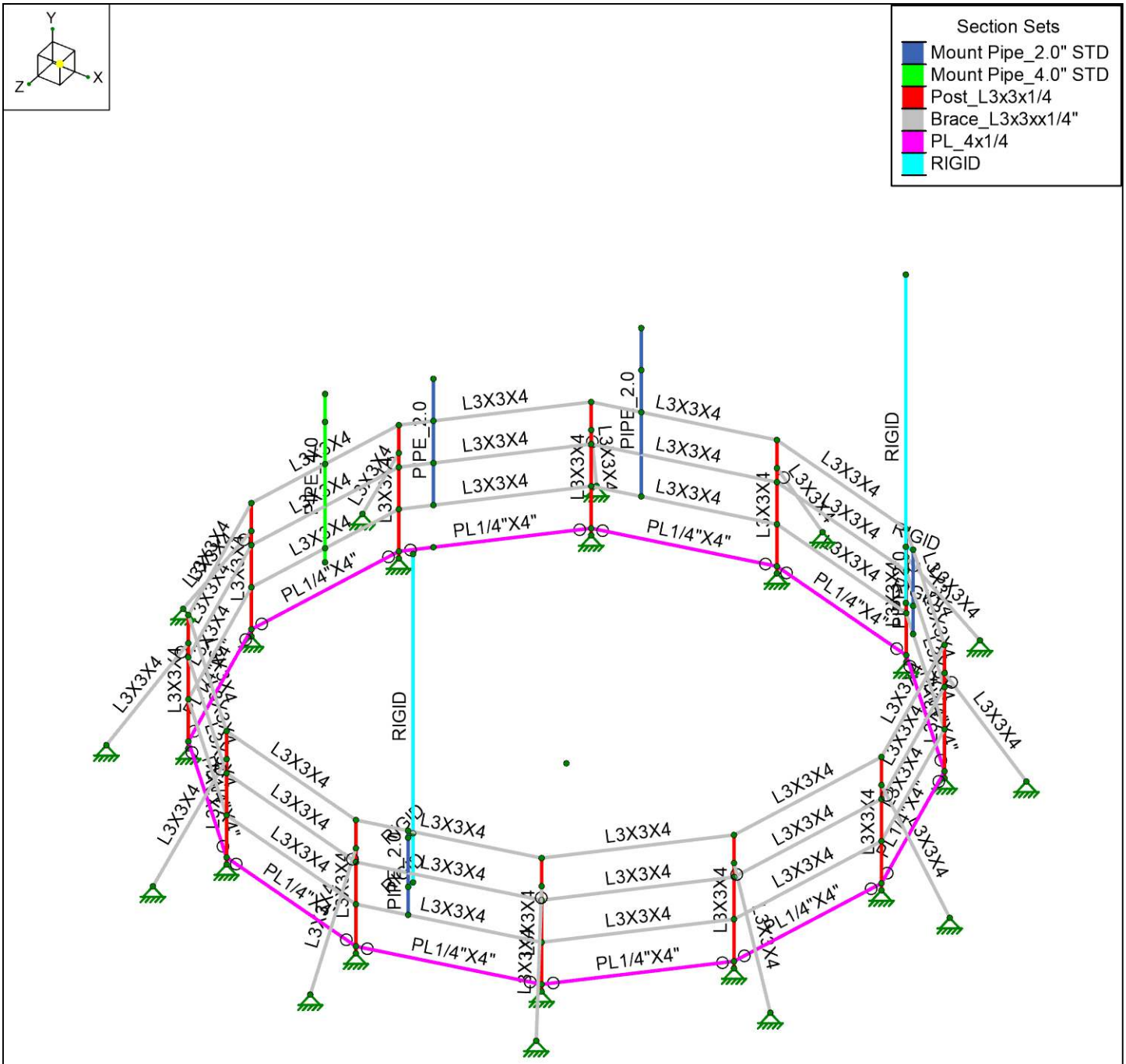

RISA	Tectonic	WFT	SK-3
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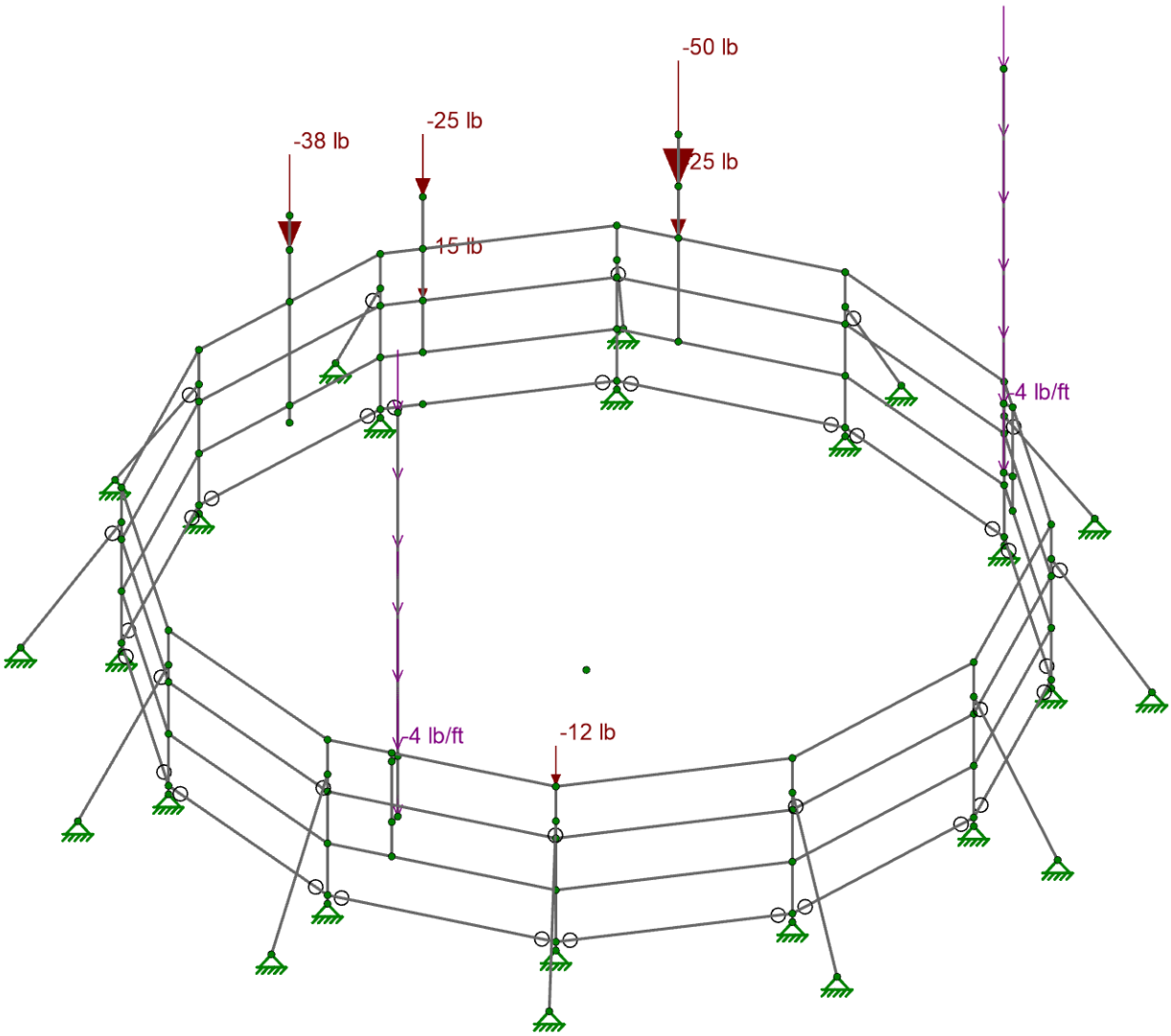

Loads: BLC 1, Dead Load

RISA	Tectonic	WFT	SK-4
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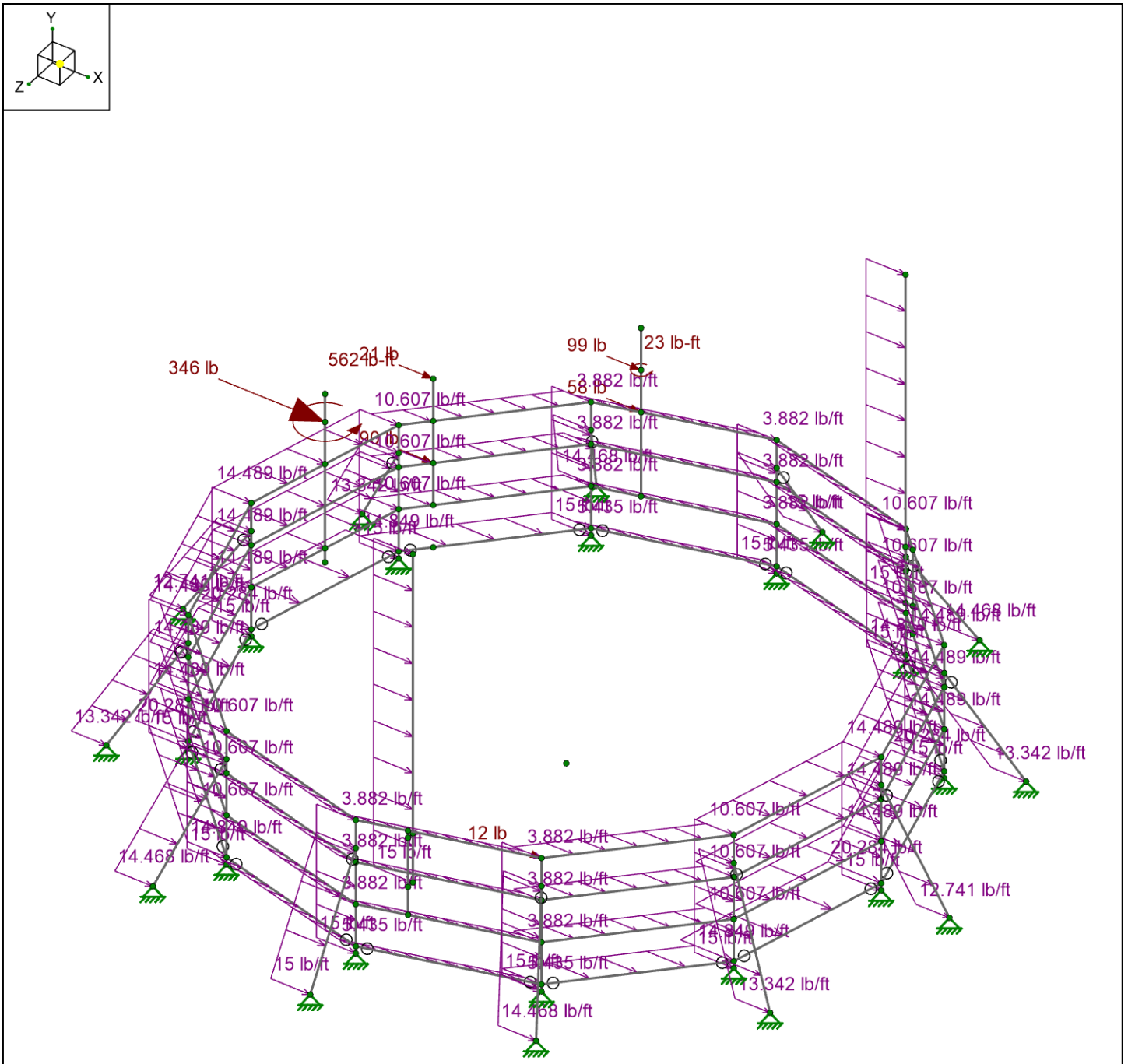

Loads: BLC 2, Wind Load X

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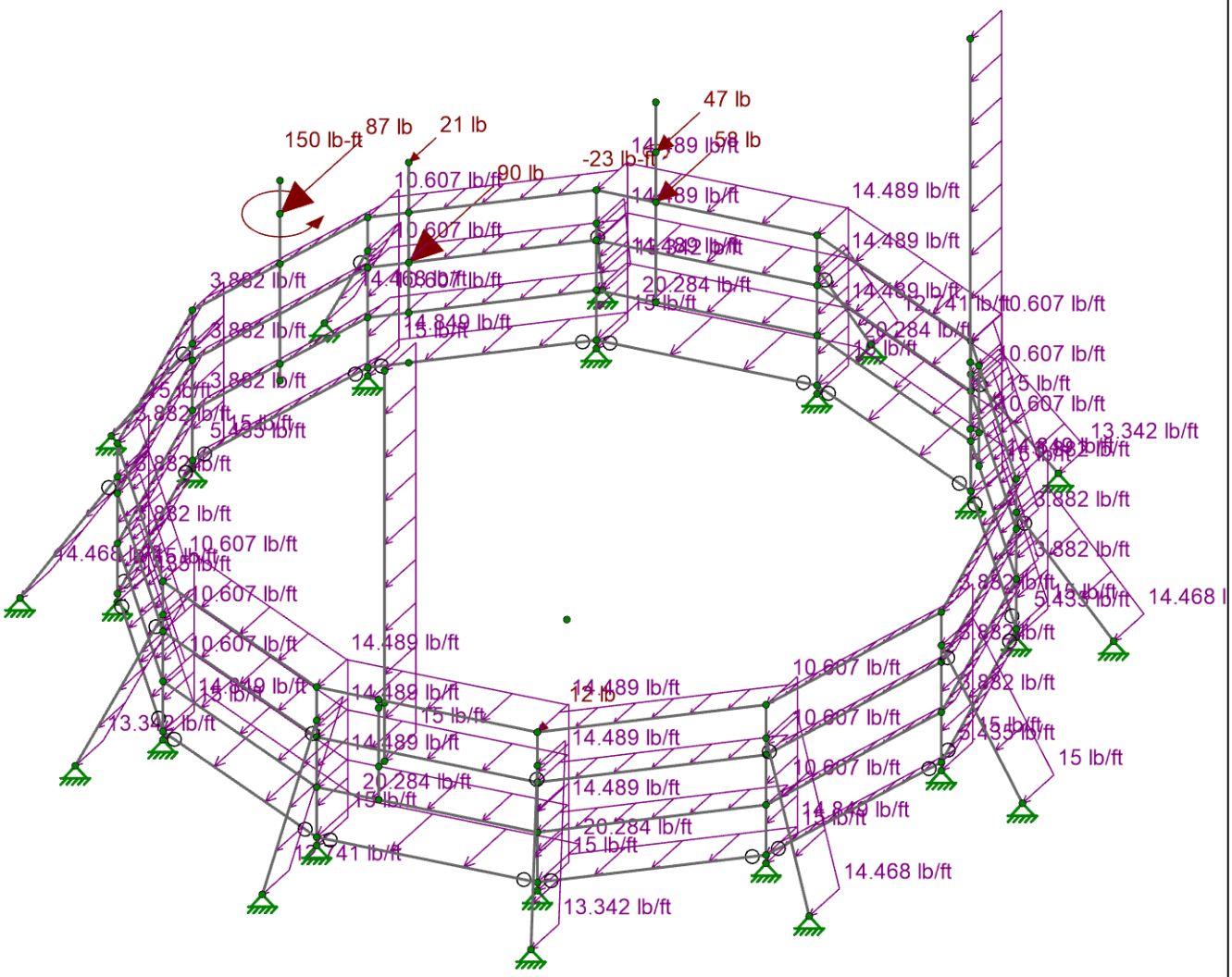

Loads: BLC 3, Wind Load Z

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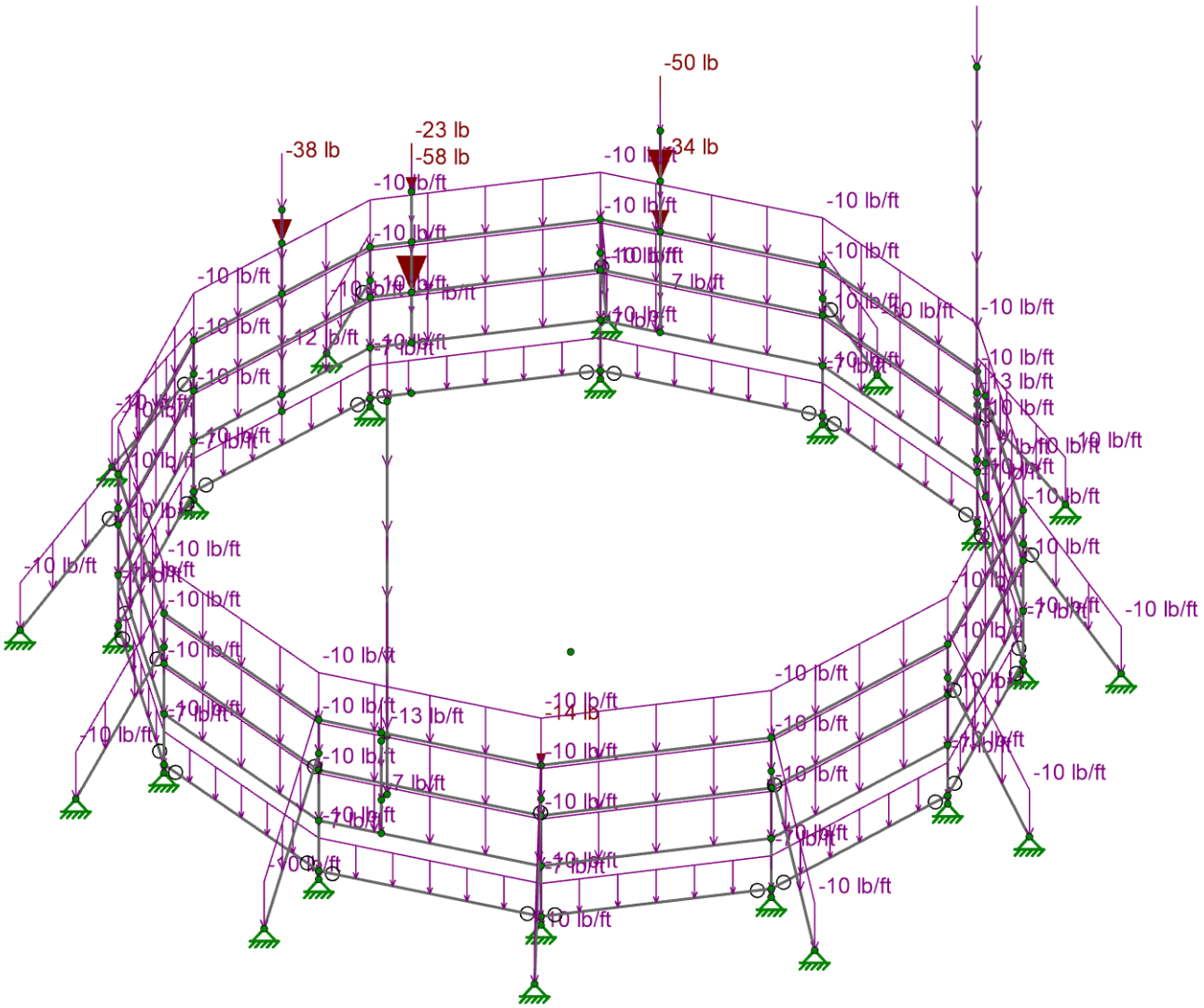

Loads: BLC 4, Dead Load of Ice (alone)

RISA	Tectonic	WFT	SK-7
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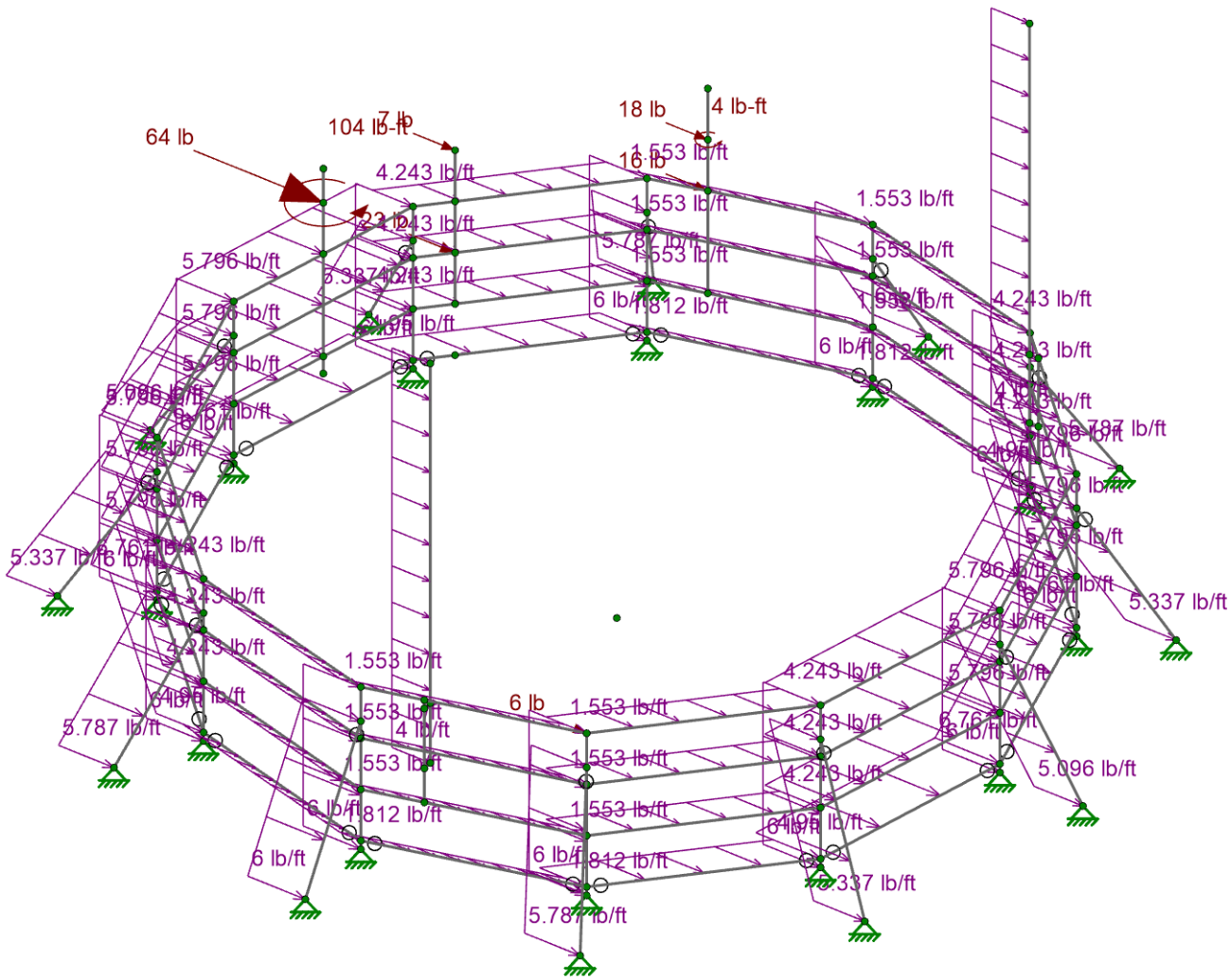

Loads: BLC 5, Wind Load w/ice X

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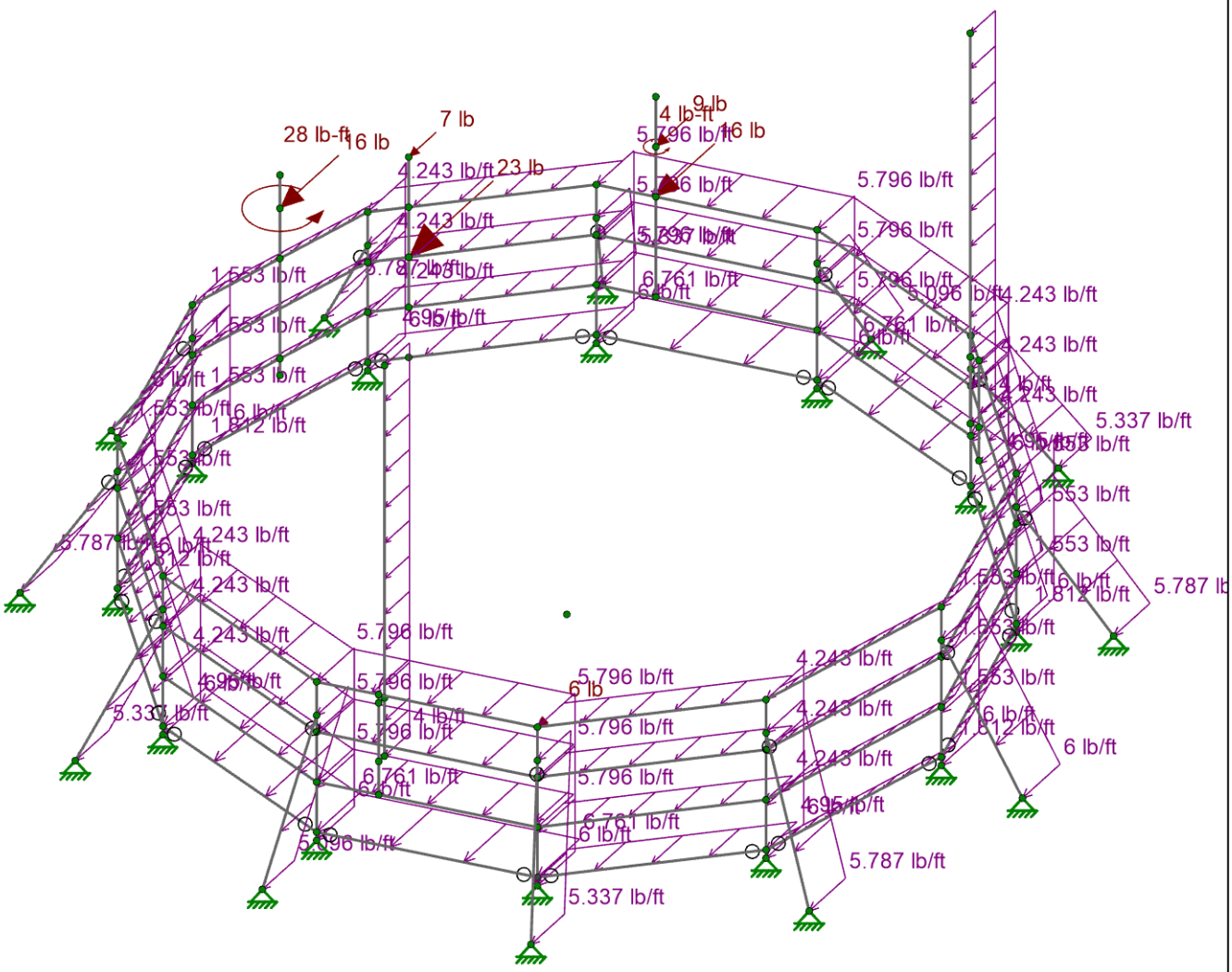

Loads: BLC 6, Wind Load w.ice Z

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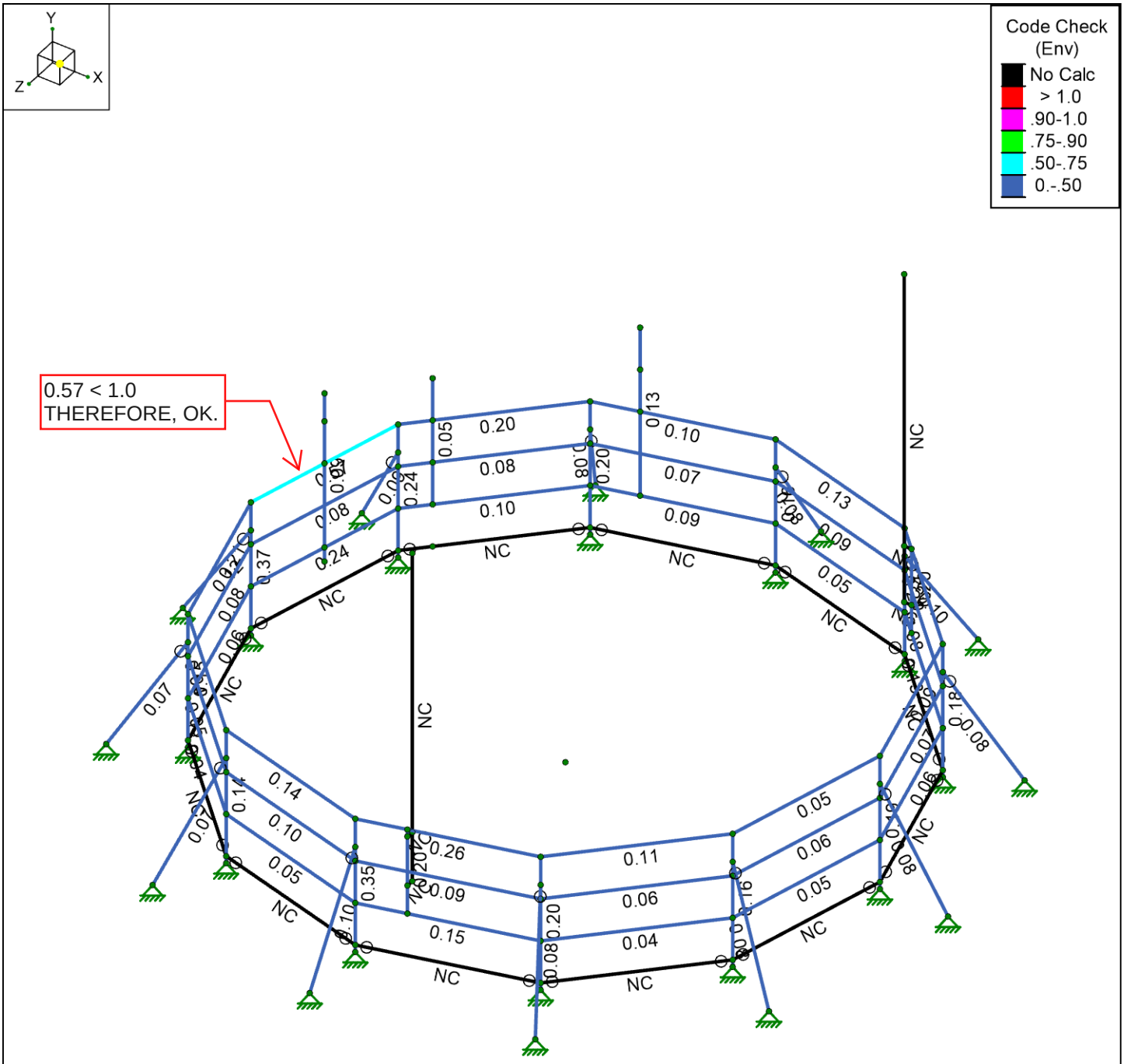

Member Code Checks Displayed (Enveloped)

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APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.4	58	1.3
6	A53.GR.B	29000	11154	0.3	0.65	0.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Mount Pipe 2.0" STD	PIPE 2.0	Column	Pipe	A53.GR.B	Typical	1.02	0.627	0.627	1.25
2	Mount Pipe 4.0" STD	PIPE 4.0	Column	Pipe	A53.GR.B	Typical	2.96	6.82	6.82	13.6
3	Post L3x3x1/4	L3X3X4	Column	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	0.031
4	Horiz L3x3x1/4	L3X3X4	Beam	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	0.031
5	Brace_L3x3xx1/4"	L3X3X4	VBrace	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	0.031
6	PL_4x1/4	PL1/4"X4"	HBrace	RECT	A36 Gr.36	Typical	1	0.005	1.333	0.02

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Distributed
1	Dead Load	DL	-1.05	6	2
2	Wind Load X	WLX		8	74
3	Wind Load Z	WLZ		8	74
4	Dead Load of Ice (alone)	SL		6	79
5	Wind Load w/ice X	WL+X		8	74
6	Wind Load w.ice Z	WL+Z		8	74

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	1	1.4						
2	1.2D+1.6WLX	Yes	Y	1	1.2	2	1.6				
3	1.2D+1.6WLZ	Yes	Y	1	1.2	3	1.6				
4	1.2D+1.6(WLX+WLZ) - 0 Deg	Yes	Y	1	1.2	2	1.6				
5	1.2D+1.6(WLX+WLZ) - 30 Deg	Yes	Y	1	1.2	2	1.385	3	0.8		
6	1.2D+1.6(WLX+WLZ) - 60 Deg	Yes	Y	1	1.2	2	0.8	3	1.385		
7	1.2D+1.6(WLX+WLZ) - 90 Deg	Yes	Y	1	1.2	2		3	1.6		
8	1.2D+1.6(WLX+WLZ) - 120 Deg	Yes	Y	1	1.2	2	-0.8	3	1.385		
9	1.2D+1.6(WLX+WLZ) - 150 Deg	Yes	Y	1	1.2	2	-1.385	3	0.8		
10	1.2D+1.6(WLX+WLZ) - 180 Deg	Yes	Y	1	1.2	2	-1.6	3			
11	1.2D+1.6(WLX+WLZ) - 210 Deg	Yes	Y	1	1.2	2	-1.385	3	-0.8		
12	1.2D+1.6(WLX+WLZ) - 240 Deg	Yes	Y	1	1.2	2	-0.8	3	-1.385		
13	1.2D+1.6(WLX+WLZ) - 270 Deg	Yes	Y	1	1.2	2		3	-1.6		
14	1.2D+1.6(WLX+WLZ) - 300 Deg	Yes	Y	1	1.2	2	0.8	3	-1.385		
15	1.2D+1.6(WLX+WLZ) - 330 Deg	Yes	Y	1	1.2	2	1.385	3	-0.8		
16	**Wind Load with Ice**										
17	1.2D+1.0Di+1.0WLXi	Yes	Y	1	1.2	4	1	5	1		
18	1.2D+1.0Di+1.0WLZi	Yes	Y	1	1.2	4	1			6	1
19	1.2D+1.0Di+1.0(WLXi+WLZi) - 0 Deg	Yes	Y	1	1.2	4	1	5	1	6	
20	1.2D+1.0Di+1.0(WLXi+WLZi) - 30 Deg	Yes	Y	1	1.2	4	1	5	0.87	6	0.5
21	1.2D+1.0Di+1.0(WLXi+WLZi) - 60 Deg	Yes	Y	1	1.2	4	1	5	0.5	6	0.87
22	1.2D+1.0Di+1.0(WLXi+WLZi) - 90 Deg	Yes	Y	1	1.2	4	1	5		6	1
23	1.2D+1.0Di+1.0(WLXi+WLZi) - 120 Deg	Yes	Y	1	1.2	4	1	5	-0.5	6	0.87
24	1.2D+1.0Di+1.0(WLXi+WLZi) - 150 Deg	Yes	Y	1	1.2	4	1	5	-0.87	6	0.5

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
25	1.2D+1.0Di+1.0(WLXi+WLZi) - 180 Deg	Yes	Y	1	1.2	4	1	5	-1	6	
26	1.2D+1.0Di+1.0(WLXi+WLZi) - 210 Deg	Yes	Y	1	1.2	4	1	5	-0.87	6	-0.5
27	1.2D+1.0Di+1.0(WLXi+WLZi) - 240 Deg	Yes	Y	1	1.2	4	1	5	-0.5	6	-0.87
28	1.2D+1.0Di+1.0(WLXi+WLZi) - 270 Deg	Yes	Y	1	1.2	4	1	5		6	-1
29	1.2D+1.0Di+1.0(WLXi+WLZi) - 300 Deg	Yes	Y	1	1.2	4	1	5	0.5	6	-0.87
30	1.2D+1.0Di+1.0(WLXi+WLZi) - 330 Deg	Yes	Y	1	1.2	4	1	5	0.87	6	-0.5

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
0	N1	max	246.509	9	1646.1	10	144.569	14	0	30	0	30	0	30
1		min	-241.583	15	-1386.139	2	-149.772	8	0	1	0	1	0	1
2	N4	max	962.002	10	1571.039	4	53	13	0	30	0	30	0	30
3		min	-1012.329	2	-1461.705	10	-52.928	3	0	1	0	1	0	1
4	N9	max	138.536	9	1541.052	9	143.366	13	0	30	0	30	0	30
5		min	-134.919	15	-1280.51	15	-143.925	3	0	1	0	1	0	1
6	N10	max	787.459	9	1484.792	15	482.699	15	0	30	0	30	0	30
7		min	-832.001	15	-1373.349	9	-456.405	9	0	1	0	1	0	1
8	N16	max	123.127	11	2127.867	8	206.456	11	0	30	0	30	0	30
9		min	-128.756	5	-1716.713	14	-202.113	5	0	1	0	1	0	1
10	N17	max	656.112	8	2104.7	14	1165.6	14	0	30	0	30	0	30
11		min	-674.694	14	-2014.833	8	-1132.727	8	0	1	0	1	0	1
12	N23	max	129.14	12	1571.031	7	278.846	13	0	30	0	30	0	30
13		min	-110.717	6	-1276.347	13	-282.597	3	0	1	0	1	0	1
14	N24	max	52.923	10	1469.477	13	949.271	13	0	30	0	30	0	30
15		min	-52.991	2	-1363.687	3	-901.06	3	0	1	0	1	0	1
16	N30	max	177.329	10	1726.336	6	145.937	13	0	30	0	30	0	30
17		min	-181.223	2	-1227.341	12	-127.911	3	0	1	0	1	0	1
18	N31	max	499.717	12	1540.978	12	862.471	12	0	30	0	30	0	30
19		min	-485.446	6	-1465.439	6	-836.812	6	0	1	0	1	0	1
20	N37	max	170.934	9	2103.216	5	102.374	13	0	30	0	30	0	30
21		min	-137.733	15	-1544.287	11	-130.822	3	0	1	0	1	0	1
22	N38	max	1017.141	11	1829.213	11	589.753	11	0	30	0	30	0	30
23		min	-1001.688	5	-1770.875	5	-579.707	5	0	1	0	1	0	1
24	N44	max	216.372	9	2422.649	4	199.613	14	0	30	0	30	0	30
25		min	-210.266	15	-1999.852	10	-178.305	8	0	1	0	1	0	1
26	N45	max	1569.092	10	2467.857	10	52.977	13	0	30	0	30	0	30
27		min	-1546.773	2	-2402.057	2	-52.968	3	0	1	0	1	0	1
28	N51	max	172.842	10	1301.797	15	251.935	14	0	30	0	30	0	30
29		min	-171.52	2	-1015.678	9	-258.417	8	0	1	0	1	0	1
30	N52	max	639.981	9	1127.31	9	356.452	15	0	30	0	30	0	30
31		min	-613.508	15	-1050.633	15	-371.299	9	0	1	0	1	0	1
32	N58	max	85.742	11	1337.991	14	312.696	13	0	30	0	30	0	30
33		min	-78.57	5	-1051.735	8	-312.765	3	0	1	0	1	0	1
34	N59	max	393.189	8	1196.926	8	649.612	14	0	30	0	30	0	30
35		min	-376.836	14	-1117.327	14	-677.266	8	0	1	0	1	0	1
36	N65	max	106.941	9	2211.99	13	74.818	12	0	30	0	30	0	30
37		min	-123.817	15	-1789.022	3	-81.044	3	0	1	0	1	0	1
38	N66	max	52.981	10	2165.026	7	1358.819	13	0	30	0	30	0	30
39		min	-52.974	2	-2099.869	13	-1381.124	3	0	1	0	1	0	1
40	N72	max	139.02	12	1642.379	12	129.078	13	0	30	0	30	0	30
41		min	-114.088	6	-1330.622	6	-131.166	3	0	1	0	1	0	1
42	N73	max	487.511	12	1574.603	6	841.141	12	0	30	0	30	0	30
43		min	-510.476	6	-1473.14	12	-880.362	6	0	1	0	1	0	1
44	N79	max	230.361	10	1431.861	11	80.91	13	0	30	0	30	0	30
45		min	-218.73	2	-1170.619	5	-85.173	3	0	1	0	1	0	1

Envelope Node Reactions (Continued)

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
46	N80	max	711.779	11	1340.731	5	413.141	11	0	30	0	30	0	30
47		min	-754.795	5	-1233.129	11	-437.506	5	0	1	0	1	0	1
48	Totals:	max	8649.696	10	6939.921	23	8152.091	13						
49		min	-8649.696	2	2660.746	14	-8152.091	3						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
0	N87	max	1.813	6	-0.002	11	1.814	6	2.438e-4	8	1.656e-1	11	3.128e-4	14
1		min	-1.598	11	-0.004	20	-1.597	11	-4.786e-4	14	-1.854e-1	6	-4.147e-4	8
2	N114	max	0.315	4	0.016	10	0.07	5	1.371e-3	5	2.819e-3	5	5.501e-3	10
3		min	-0.3	10	-0.033	2	-0.07	11	-1.384e-3	11	-2.867e-3	11	-5.59e-3	2
4	N104	max	0.293	15	0.011	14	0.323	8	2.312e-3	8	7.007e-4	14	2.01e-3	9
5		min	-0.289	9	-0.014	8	-0.309	14	-2.222e-3	14	-7.82e-4	8	-2.03e-3	15
6	N115	max	0.248	4	0.016	10	0.054	5	1.371e-3	5	2.819e-3	5	5.501e-3	10
7		min	-0.234	10	-0.033	2	-0.053	11	-1.384e-3	11	-2.867e-3	11	-5.59e-3	2
8	N110	max	0.15	4	0.016	10	0.029	5	1.3e-3	5	1.54e-3	5	4.934e-3	10
9		min	-0.138	10	-0.033	2	-0.029	11	-1.312e-3	11	-1.588e-3	11	-5.023e-3	2
10	N108	max	0.135	5	0.021	7	0.501	7	3.515e-3	7	1.056e-3	12	9.991e-4	11
11		min	-0.142	11	-0.027	13	-0.521	13	-3.642e-3	13	-1.005e-3	6	-9.649e-4	5
12	N100	max	0.13	4	0.005	11	0.113	6	2.331e-3	6	1.075e-3	13	2.524e-3	10
13		min	-0.115	10	-0.014	5	-0.112	12	-2.4e-3	12	-1.234e-3	3	-2.784e-3	2
14	N101	max	0.08	4	0.005	11	0.071	6	2.331e-3	6	1.075e-3	13	2.524e-3	10
15		min	-0.07	10	-0.014	5	-0.069	12	-2.4e-3	12	-1.234e-3	3	-2.783e-3	2
16	N102	max	0.057	15	0.011	14	0.054	8	2.312e-3	8	7.007e-4	14	2.01e-3	9
17		min	-0.055	9	-0.014	8	-0.05	14	-2.222e-3	14	-7.82e-4	8	-2.03e-3	15
18	N94	max	0.057	15	0.007	13	0.056	8	2.312e-3	8	7.007e-4	14	2.01e-3	9
19		min	-0.055	9	-0.009	3	-0.052	14	-2.222e-3	14	-7.82e-4	8	-2.03e-3	15
20	N18	max	0.046	15	0.002	14	0.044	7	3.101e-3	8	1.351e-3	14	2.051e-3	8
21		min	-0.043	9	-0.002	8	-0.042	13	-2.98e-3	14	-1.476e-3	8	-2.11e-3	14
22	N46	max	0.045	4	0.003	10	0.016	7	1.154e-4	4	3.331e-3	10	2.483e-3	10
23		min	-0.044	10	-0.003	2	-0.018	13	-2.884e-4	10	-3.479e-3	2	-2.543e-3	2
24	N25	max	0.04	4	0.002	13	0.011	5	1.063e-3	4	7.372e-4	8	5.073e-4	9
25		min	-0.036	10	-0.002	3	-0.012	11	-1.051e-3	10	-7.528e-4	14	-4.915e-4	15
26	N93	max	0.04	4	0.006	11	0.035	7	1.605e-3	6	8.459e-4	11	8.983e-4	11
27		min	-0.034	10	-0.014	5	-0.032	13	-1.673e-3	12	-1.005e-3	5	-1.157e-3	5
28	N39	max	0.039	4	0.002	11	0.016	8	1.175e-3	4	2.533e-3	4	1.444e-3	10
29		min	-0.035	10	-0.002	5	-0.017	14	-8.971e-4	10	-2.474e-3	10	-1.668e-3	2
30	N88	max	0.038	4	0.006	10	0.033	9	6.576e-4	8	6.752e-4	4	6.497e-4	10
31		min	-0.032	10	-0.008	2	-0.035	15	-6.964e-4	14	-7.426e-4	10	-8.005e-4	2
32	N112	max	0.037	10	0.016	10	0.024	9	1.071e-3	4	6.79e-4	5	3.856e-3	10
33		min	-0.029	2	-0.033	2	-0.023	15	-1.084e-3	10	-7.135e-4	11	-3.945e-3	2
34	N32	max	0.035	4	0.002	12	0.021	8	8.057e-4	6	1.045e-3	11	5.432e-4	11
35		min	-0.031	10	-0.002	6	-0.022	14	-8.365e-4	12	-1.178e-3	5	-7.672e-4	5
36	N11	max	0.03	5	0.002	15	0.02	6	4.466e-4	9	9.97e-4	9	8.546e-4	11
37		min	-0.028	11	-0.002	9	-0.017	12	-4.324e-4	15	-1.023e-3	15	-9.236e-4	5
38	N26	max	0.028	4	0.002	13	0.008	7	6.925e-4	14	5.792e-4	9	9.936e-4	10
39		min	-0.026	10	-0.002	3	-0.008	13	-7.945e-4	8	-6.25e-4	15	-1.127e-3	2
40	N89	max	0.026	4	0.006	10	0.024	9	4.235e-4	9	6.752e-4	4	2.753e-4	10
41		min	-0.022	10	-0.008	2	-0.025	15	-4.63e-4	15	-7.426e-4	10	-4.261e-4	2
42	N33	max	0.025	4	0.002	12	0.013	8	4.227e-4	9	5.231e-4	11	6.718e-4	10
43		min	-0.023	10	-0.002	6	-0.014	14	-4.143e-4	15	-5.917e-4	5	-7.718e-4	2
44	N19	max	0.024	4	0.002	14	0.015	6	2.148e-3	8	3.984e-4	14	1.546e-3	9
45		min	-0.022	10	-0.003	8	-0.013	12	-2.058e-3	14	-4.608e-4	8	-1.591e-3	15
46	N107	max	0.02	5	0.021	7	0.081	7	3.515e-3	7	1.056e-3	12	9.991e-4	11
47		min	-0.023	11	-0.027	13	-0.086	13	-3.642e-3	13	-1.005e-3	6	-9.649e-4	5

SERVICE DEFLECTION = 1.814 X [(60MPH)^2/(93MPH)^2] = 0.75" < 1.0"
HENCE, OK.

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
48	N29	max	0.022	4	0.002	13	0.014	7	9.147e-4	14	5.678e-4	10	6.101e-4	10
49		min	-0.02	10	-0.002	3	-0.013	13	-9.508e-4	8	-6.297e-4	2	-6.937e-4	2
50	N99	max	0.019	5	0.01	7	0.091	7	3.265e-3	7	1.219e-3	12	7.037e-4	12
51		min	-0.022	11	-0.016	13	-0.096	13	-3.419e-3	13	-1.176e-3	6	-7.77e-4	6
52	N36	max	0.021	4	0.001	12	0.013	8	3.796e-4	12	2.62e-4	11	3.964e-4	10
53		min	-0.019	10	-0.002	6	-0.014	14	-3.275e-4	6	-2.986e-4	5	-4.604e-4	2
54	N113	max	0.017	5	0.01	7	0.081	7	3.515e-3	7	1.056e-3	12	9.991e-4	11
55		min	-0.02	11	-0.016	13	-0.086	13	-3.642e-3	13	-1.005e-3	6	-9.649e-4	5
56	N40	max	0.02	4	0.002	11	0.017	9	1.889e-4	7	5.26e-4	4	9.553e-4	10
57		min	-0.018	10	-0.002	5	-0.019	15	-2.716e-4	13	-5.525e-4	10	-1.067e-3	2
58	N86	max	0.02	4	0.006	10	0.015	8	4.008e-4	10	3.893e-4	11	3.889e-5	8
59		min	-0.018	10	-0.007	2	-0.016	14	-4.258e-4	2	-4.557e-4	5	-1.571e-4	30
60	N60	max	0.018	5	0.001	8	0.007	8	3.888e-4	11	3.843e-4	6	6.342e-4	11
61		min	-0.02	11	-0.002	14	-0.008	14	-4.178e-4	5	-4.027e-4	12	-6.368e-4	5
62	N22	max	0.018	5	0.002	14	0.012	5	1.279e-3	8	2.466e-4	11	7.451e-4	9
63		min	-0.016	11	-0.002	8	-0.011	11	-1.182e-3	14	-2.79e-4	5	-7.3e-4	15
64	N74	max	0.016	15	0.002	6	0.024	6	1.252e-3	5	1.399e-3	7	7.44e-4	10
65		min	-0.017	9	-0.002	12	-0.022	12	-1.197e-3	11	-1.462e-3	13	-7.773e-4	2
66	N7	max	0.017	15	0.001	4	0.012	5	2.223e-4	5	2.271e-4	9	2.146e-4	9
67		min	-0.017	9	-0.001	10	-0.011	11	-1.954e-4	11	-2.417e-4	15	-1.803e-4	15
68	N81	max	0.017	14	0.002	5	0.017	6	4.949e-4	4	5.956e-4	12	8.897e-4	8
69		min	-0.017	8	-0.002	11	-0.015	12	-4.727e-4	10	-5.949e-4	6	-9.397e-4	14
70	N90	max	0.017	4	0.005	10	0.013	7	3.32e-4	10	8.44e-4	10	9.552e-5	11
71		min	-0.016	10	-0.007	2	-0.013	13	-3.922e-4	2	-9.215e-4	2	-2.28e-4	5
72	N12	max	0.016	5	0.002	15	0.017	6	4.255e-4	8	1.375e-4	11	9.226e-4	12
73		min	-0.015	11	-0.002	9	-0.015	12	-3.851e-4	14	-1.799e-4	5	-1.026e-3	6
74	N43	max	0.016	4	0.002	11	0.015	8	2.075e-4	10	4.432e-4	11	5.016e-4	10
75		min	-0.014	10	-0.002	5	-0.017	14	-2.529e-4	2	-5.129e-4	5	-6.014e-4	2
76	N15	max	0.016	4	0.002	15	0.015	6	2.065e-4	7	3.811e-4	14	5.565e-4	13
77		min	-0.015	10	-0.002	9	-0.014	11	-1.72e-4	13	-4.34e-4	8	-5.854e-4	3
78	N2	max	0.015	5	0.002	4	0.022	6	3.095e-4	6	4.662e-4	13	6.833e-4	11
79		min	-0.014	11	-0.002	10	-0.02	12	-2.898e-4	12	-5.112e-4	3	-7.258e-4	5
80	N56	max	0.014	4	0.001	9	0.016	9	2.862e-4	9	3.839e-4	10	1.799e-4	9
81		min	-0.015	10	-0.001	15	-0.018	15	-3.206e-4	15	-4.063e-4	2	-2.046e-4	15
82	N14	max	0.015	15	0.001	15	0.012	5	2.505e-4	5	5.432e-4	14	2.957e-4	8
83		min	-0.015	9	-0.001	9	-0.011	11	-2.121e-4	11	-5.926e-4	8	-2.68e-4	14
84	N111	max	0.014	11	0.016	10	0.019	9	1.071e-3	4	6.79e-4	5	3.856e-3	10
85		min	-0.006	5	-0.033	2	-0.017	15	-1.084e-3	10	-7.135e-4	11	-3.945e-3	2
86	N96	max	0.014	4	0.005	11	0.02	7	7.55e-5	13	2.288e-4	13	2.196e-4	11
87		min	-0.013	10	-0.013	5	-0.016	13	-1.537e-4	3	-4.295e-4	3	-5.058e-4	5
88	N35	max	0.014	4	0.001	12	0.013	8	5.811e-5	8	8.941e-5	4	3.271e-4	10
89		min	-0.013	10	-0.001	6	-0.013	14	-1.219e-4	14	-1.937e-4	10	-4.503e-4	2
90	N47	max	0.013	4	0.003	10	0.017	8	4.905e-4	5	1.091e-3	10	1.541e-3	10
91		min	-0.013	10	-0.003	2	-0.019	14	-4.773e-4	11	-1.136e-3	2	-1.614e-3	2
92	N67	max	0.012	4	0.002	7	0.05	7	3.288e-3	7	2.432e-3	13	1.951e-4	9
93		min	-0.013	10	-0.003	13	-0.052	13	-3.545e-3	13	-2.33e-3	3	-3.309e-4	15
94	N28	max	0.013	4	0.001	13	0.021	8	3.214e-4	6	2.617e-4	10	2.586e-4	10
95		min	-0.012	10	-0.001	3	-0.02	14	-2.415e-4	12	-2.59e-4	2	-2.39e-4	2
96	N8	max	0.012	4	0.002	4	0.015	6	2.841e-4	8	5.611e-5	13	6.631e-4	15
97		min	-0.013	10	-0.002	10	-0.013	12	-2.637e-4	14	-8.02e-5	3	-6.741e-4	9
98	N105	max	0.011	5	0.007	13	0.012	5	2.312e-3	8	7.007e-4	14	2.01e-3	9
99		min	-0.01	11	-0.009	3	-0.01	11	-2.222e-3	14	-7.82e-4	8	-2.03e-3	15
100	N103	max	0.011	5	0.011	14	0.012	5	2.312e-3	8	7.007e-4	14	2.01e-3	9
101		min	-0.01	11	-0.014	8	-0.01	11	-2.222e-3	14	-7.82e-4	8	-2.03e-3	15
102	N84	max	0.01	5	0.001	5	0.013	6	2.072e-4	5	3.629e-4	9	1.206e-4	10

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
103		min	-0.011	11	-0.001	11	-0.012	12	-2.05e-4	11	-4.025e-4	14	-7.782e-5	2
104	N21	max	0.01	6	0.001	14	0.016	15	2.846e-4	5	1.063e-3	9	2.38e-4	12
105		min	-0.009	12	-0.001	8	-0.016	9	-2.339e-4	11	-1.082e-3	15	-2.9e-4	6
106	N95	max	0.01	7	0.006	13	0.022	15	1.21e-3	8	1.335e-4	10	3.935e-4	9
107		min	-0.01	13	-0.009	3	-0.022	9	-1.071e-3	14	-2.318e-4	2	-5.126e-4	15
108	N57	max	0.008	4	0.001	9	0.014	8	6.488e-4	4	5.82e-5	12	8.092e-4	15
109		min	-0.009	10	-0.001	15	-0.016	14	-6.703e-4	10	-7.55e-5	6	-8.2e-4	9
110	N5	max	0.009	4	0.002	4	0.017	6	4.857e-4	7	1.928e-4	13	5.489e-4	14
111		min	-0.009	10	-0.002	10	-0.015	12	-4.384e-4	13	-2.239e-4	3	-6.087e-4	8
112	N50	max	0.009	4	0.002	10	0.016	8	1.677e-4	7	1.944e-4	7	4.07e-4	10
113		min	-0.009	10	-0.003	2	-0.018	14	-1.349e-4	13	-1.922e-4	13	-4.936e-4	2
114	N63	max	0.007	13	0.001	8	0.018	7	2.479e-4	7	3.48e-4	11	8.569e-5	6
115		min	-0.008	3	-0.001	14	-0.018	13	-2.884e-4	13	-3.814e-4	5	-7.729e-5	12
116	N61	max	0.006	6	0.001	8	0.009	7	5.458e-4	13	2.805e-4	7	1.215e-3	12
117		min	-0.008	12	-0.002	14	-0.01	13	-5.567e-4	3	-3.038e-4	13	-1.199e-3	6
118	N82	max	0.006	15	0.002	5	0.013	6	1.783e-4	8	2.501e-4	11	7.297e-4	7
119		min	-0.007	9	-0.002	11	-0.011	12	-1.399e-4	14	-2.615e-4	5	-7.784e-4	13
120	N68	max	0.005	5	0.002	7	0.011	7	2.123e-3	7	6.205e-4	13	6.805e-4	11
121		min	-0.007	11	-0.003	13	-0.012	13	-2.229e-3	13	-6.044e-4	3	-6.603e-4	5
122	N85	max	0.006	4	0.001	5	0.014	6	2.595e-4	11	1.572e-4	10	6.238e-4	6
123		min	-0.007	10	-0.002	11	-0.012	12	-2.529e-4	5	-1.736e-4	2	-6.386e-4	12
124	N42	max	0.007	15	0.001	11	0.014	8	2.468e-4	5	1.293e-3	10	4.248e-4	10
125		min	-0.007	9	-0.001	5	-0.015	14	-9.946e-5	11	-1.257e-3	2	-5.155e-4	2
126	N75	max	0.005	15	0.002	6	0.01	7	5.968e-4	6	3.243e-4	6	8.197e-4	9
127		min	-0.007	9	-0.002	12	-0.009	13	-5.774e-4	12	-3.356e-4	12	-8.738e-4	15
128	N98	max	0.003	12	0.01	7	0.02	12	1.842e-3	7	1.529e-4	29	1.086e-4	4
129		min	-0.006	6	-0.016	13	-0.021	6	-1.973e-3	13	2.404e-5	9	-2.903e-4	25
130	N54	max	0.005	5	0.001	9	0.012	8	9.721e-4	4	2.455e-4	4	6.405e-4	15
131		min	-0.006	11	-0.002	15	-0.014	14	-9.86e-4	10	-2.606e-4	10	-6.161e-4	9
132	N49	max	0.005	4	0.001	10	0.014	8	2.662e-4	9	6.642e-4	4	1.757e-4	9
133		min	-0.005	10	-0.002	2	-0.016	14	-4.002e-4	15	-7.25e-4	10	-1.774e-4	15
134	N53	max	0.003	7	0.001	9	0.017	6	8.349e-4	4	8.159e-4	4	4.598e-4	5
135		min	-0.004	13	-0.002	15	-0.019	12	-8.301e-4	10	-8.266e-4	10	-4.857e-4	11
136	N77	max	0.002	7	0.001	6	0.009	7	1.411e-4	6	8.758e-4	12	1.214e-4	13
137		min	-0.004	13	-0.001	12	-0.009	13	-1.516e-4	12	-8.621e-4	6	-6.693e-5	3
138	N71	max	0.001	4	0.002	7	0.003	7	1.046e-3	7	3.47e-4	6	4.748e-4	12
139		min	-0.004	25	-0.002	13	-0.003	13	-1.143e-3	13	-3.737e-4	12	-4.471e-4	6
140	N78	max	0.001	4	0.002	6	0.01	7	2.333e-4	15	2.467e-4	13	4.994e-4	9
141		min	-0.004	25	-0.002	12	-0.009	13	-2.496e-4	9	-2.327e-4	3	-5.302e-4	15
142	N106	max	0.001	7	0.021	7	0.007	7	3.515e-3	7	1.056e-3	12	9.991e-4	11
143		min	-0.004	25	-0.027	13	-0.009	13	-3.642e-3	13	-1.005e-3	6	-9.649e-4	5
144	N6	max	0.004	4	0	4	0.002	5	7.758e-4	5	2.271e-4	9	1.172e-3	10
145		min	-0.004	10	0	10	-0.002	11	-7.058e-4	11	-2.417e-4	15	-1.148e-3	2
146	N70	max	0	14	0.001	7	0.008	13	1.538e-4	7	1.214e-3	6	1.769e-4	7
147		min	-0.004	24	-0.001	13	-0.007	3	-2.578e-4	13	-1.223e-3	12	-2.47e-4	13
148	N64	max	0.002	15	0.001	8	0.013	7	5.723e-4	13	3.213e-4	8	7.598e-4	13
149		min	-0.003	24	-0.002	14	-0.014	13	-6.046e-4	3	-3.475e-4	14	-7.738e-4	3
150	N109	max	0.001	11	0.01	7	0.007	7	3.515e-3	7	1.056e-3	12	9.991e-4	11
151		min	-0.003	24	-0.016	13	-0.009	13	-3.642e-3	13	-1.005e-3	6	-9.649e-4	5
152	N55	max	0.003	4	0	9	0.003	9	9.77e-4	9	3.839e-4	10	1.04e-3	10
153		min	-0.003	10	0	15	-0.003	15	-1.043e-3	15	-4.063e-4	2	-9.903e-4	2
154	N13	max	0.003	15	0	15	0.002	5	7.414e-4	5	5.432e-4	14	9.707e-4	9
155		min	-0.003	9	0	9	-0.002	11	-6.898e-4	11	-5.926e-4	8	-9.762e-4	15
156	N27	max	0.003	4	0	13	0.004	8	1.387e-3	8	2.617e-4	10	7.777e-4	10
157		min	-0.002	10	0	3	-0.004	14	-1.353e-3	14	-2.59e-4	2	-8.27e-4	2

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
158	N34	max	0.002	4	0	12	0.003	7	9.409e-4	8	8.941e-5	4	7.858e-4	10
159		min	-0.002	10	0	6	-0.003	14	-9.718e-4	14	-1.937e-4	10	-7.759e-4	2
160	N83	max	0.002	5	0	5	0.003	6	8.974e-4	6	3.629e-4	9	7.249e-4	11
161		min	-0.002	11	0	11	-0.003	12	-8.287e-4	12	-4.025e-4	14	-6.565e-4	5
162	N20	max	0.002	5	0	14	0.003	15	9.604e-4	15	1.063e-3	9	5.918e-4	11
163		min	-0.002	11	0	8	-0.003	9	-9.909e-4	9	-1.082e-3	15	-6.441e-4	5
164	N62	max	0.001	14	0	8	0.004	7	1.13e-3	7	3.48e-4	11	5.63e-4	8
165		min	-0.002	8	0	14	-0.004	13	-1.152e-3	13	-3.814e-4	5	-4.796e-4	14
166	N48	max	0.001	4	0	10	0.003	8	9.163e-4	8	6.642e-4	4	3.849e-4	10
167		min	-0.001	10	0	2	-0.003	14	-9.643e-4	14	-7.25e-4	10	-3.392e-4	2
168	N41	max	0.001	15	0	11	0.003	8	9.811e-4	8	1.293e-3	10	3.415e-4	9
169		min	-0.001	9	0	5	-0.003	14	-1.092e-3	14	-1.257e-3	2	-2.988e-4	15
170	N69	max	0	15	0	7	0.002	13	5.606e-4	13	1.214e-3	6	2.755e-4	24
171		min	-0.001	24	0	13	-0.001	3	-4.362e-4	3	-1.223e-3	12	-2.74e-5	15
172	N76	max	0	7	0	6	0.002	8	6.782e-4	8	8.758e-4	12	2.334e-4	13
173		min	-0.001	13	0	12	-0.002	14	-6.289e-4	14	-8.621e-4	6	-1.295e-4	3
174	N45	max	0	4	0	4	0	7	1.133e-3	8	5.014e-4	11	7.392e-4	9
175		min	0	10	0	10	0	13	-1.269e-3	14	-4.537e-4	5	-9.348e-4	15
176	N38	max	0	5	0	5	0	5	5.003e-4	8	7.326e-4	15	9.25e-4	10
177		min	0	11	0	11	0	11	-5.611e-4	14	-7.236e-4	9	-1.19e-3	2
178	N4	max	0	4	0	10	0	7	1.091e-3	7	1.521e-4	7	8.535e-4	9
179		min	0	10	0	2	0	13	-9.346e-4	13	-1.155e-4	13	-6.666e-4	15
180	N10	max	0	15	0	9	0	9	1.387e-3	7	1.347e-4	7	5.867e-4	10
181		min	0	9	0	15	0	15	-1.142e-3	13	-1.214e-4	13	-5.14e-4	2
182	N80	max	0	5	0	11	0	5	6.48e-4	7	3.97e-4	10	1.055e-3	9
183		min	0	11	0	5	0	11	-6.255e-4	13	-3.314e-4	2	-8.256e-4	15
184	N17	max	0	14	0	8	0	8	1.317e-3	6	2.223e-4	15	8.322e-4	11
185		min	0	8	0	14	0	14	-1.058e-3	12	-2.226e-4	9	-8.944e-4	5
186	N52	max	0	15	0	15	0	9	1.032e-3	7	5.89e-4	15	4.099e-4	9
187		min	0	9	0	9	0	15	-1.249e-3	13	-5.328e-4	9	-5.043e-4	15
188	N73	max	0	6	0	12	0	6	4.099e-4	6	1.992e-4	10	1.185e-3	10
189		min	0	12	0	6	0	12	-5.16e-4	12	-1.153e-4	2	-9.886e-4	2
190	N31	max	0	6	0	6	0	6	4.312e-4	8	2.593e-4	13	1.481e-3	10
191		min	0	12	0	12	0	12	-3.528e-4	14	-2.65e-4	3	-1.739e-3	2
192	N59	max	0	14	0	14	0	8	9.832e-4	7	1.416e-4	8	6.203e-4	12
193		min	0	8	0	8	0	14	-1.219e-3	13	-9.029e-5	14	-5.932e-4	6
194	N1	max	0	15	0	4	0	8	8.031e-4	5	2.271e-4	9	1.222e-3	10
195		min	0	9	0	10	0	14	-7.33e-4	11	-2.417e-4	15	-1.196e-3	2
196	N79	max	0	4	0	5	0	7	9.322e-4	6	3.629e-4	9	7.526e-4	11
197		min	0	10	0	11	0	13	-8.632e-4	12	-4.025e-4	14	-6.829e-4	5
198	N44	max	0	15	0	10	0	8	9.362e-4	8	6.642e-4	4	4.194e-4	10
199		min	0	9	0	2	0	14	-9.907e-4	14	-7.25e-4	10	-3.69e-4	2
200	N30	max	0	4	0	12	0	7	9.835e-4	8	8.941e-5	4	8.051e-4	10
201		min	0	10	0	6	0	13	-1.021e-3	14	-1.937e-4	10	-7.971e-4	2
202	N51	max	0	4	0	9	0	8	9.937e-4	9	3.839e-4	10	1.091e-3	10
203		min	0	10	0	15	0	14	-1.059e-3	15	-4.063e-4	2	-1.042e-3	2
204	N37	max	0	15	0	11	0	7	1.013e-3	8	1.293e-3	10	3.561e-4	9
205		min	0	9	0	5	0	13	-1.115e-3	14	-1.257e-3	2	-3.117e-4	15
206	N72	max	0	6	0	6	0	7	7.204e-4	8	8.758e-4	12	2.369e-4	13
207		min	0	12	0	12	0	13	-6.69e-4	14	-8.621e-4	6	-1.3e-4	3
208	N9	max	0	15	0	15	0	7	7.595e-4	5	5.432e-4	14	1.019e-3	9
209		min	0	9	0	9	0	13	-7.084e-4	11	-5.926e-4	8	-1.023e-3	15
210	N23	max	0	6	0	13	0	7	1.443e-3	8	2.617e-4	10	7.998e-4	10
211		min	0	12	0	3	0	13	-1.404e-3	14	-2.59e-4	2	-8.438e-4	2
212	N16	max	0	5	0	14	0	5	9.67e-4	15	1.063e-3	9	6.221e-4	11

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
213		min	0	11	0	8	0	11	-9.988e-4	9	-1.082e-3	15	-6.768e-4	5
214	N65	max	0	15	0	7	0	7	5.323e-4	13	1.214e-3	6	2.766e-4	24
215		min	0	9	0	13	0	12	-4.085e-4	3	-1.223e-3	12	-5.993e-5	15
216	N58	max	0	5	0	8	0	7	1.165e-3	7	3.48e-4	11	5.874e-4	8
217		min	0	11	0	14	0	13	-1.187e-3	13	-3.814e-4	5	-5.016e-4	14
218	N24	max	0	4	0	7	0	7	8.53e-4	6	4.797e-4	8	1.447e-3	10
219		min	0	10	0	13	0	13	-6.646e-4	12	-4.851e-4	14	-1.643e-3	2
220	N66	max	0	4	0	13	0	7	7.141e-4	6	5.776e-4	13	9.029e-4	10
221		min	0	10	0	3	0	13	-9.095e-4	12	-4.959e-4	3	-7.752e-4	2
222	N3	max	0	30	0	30	0	30	0	30	0	30	0	30
223		min	0	1	0	1	0	1	0	1	0	1	0	1

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
0	M37	L3X3X4	0.572	2.782	4	0.049	0	y	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
1	M13	L3X3X4	0.366	3.711	4	0.077	3.711	z	4	28304.144	46656	1688.138	3602.83	1.5	H2-1
2	M19	L3X3X4	0.348	3.711	13	0.064	3.76	z	7	28304.144	46656	1688.138	3602.83	1.5	H2-1
3	M5	L3X3X4	0.337	3.711	8	0.056	3.76	z	14	28304.144	46656	1688.138	3602.83	1.5	H2-1
4	M33	L3X3X4	0.263	4.058	12	0.038	5.565	y	6	23497.238	46656	1688.138	3503.629	1.5	H2-1
5	M51	L3X3X4	0.243	2.782	4	0.032	2.782	z	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
6	M11	L3X3X4	0.242	3.711	4	0.061	3.711	z	5	28304.144	46656	1688.138	3602.83	1.5	H2-1
7	M36	L3X3X4	0.209	5.565	4	0.015	5.565	y	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
8	M29	L3X3X4	0.207	0.985	9	0.048	0	y	8	23497.238	46656	1688.138	3503.629	1.5	H2-1
9	M78	PIPE_2.0	0.202	1	12	0.116	3		7	28843.414	32130	1871.625	1871.625	1	H1-1b
10	M38	L3X3X4	0.202	0	4	0.031	0	z	10	23497.238	46656	1688.138	3503.629	1.5	H2-1
11	M77	PIPE_2.0	0.201	1	9	0.084	1		8	28843.414	32130	1871.625	1871.625	1	H1-1b
12	M9	L3X3X4	0.199	3.711	6	0.043	3.711	z	6	28304.144	46656	1688.138	3602.83	1.5	H2-1
13	M21	L3X3X4	0.197	3.711	12	0.048	3.711	z	6	28304.144	46656	1688.138	3602.83	1.5	H2-1
14	M1	L3X3X4	0.189	3.711	10	0.043	3.711	z	4	28304.144	46656	1688.138	3602.83	1.5	H2-1
15	M3	L3X3X4	0.183	3.711	10	0.045	3.711	z	15	28304.144	46656	1688.138	3602.83	1.5	H2-1
16	M23	L3X3X4	0.164	3.711	10	0.039	3.711	z	5	28304.144	46656	1688.138	3602.83	1.5	H2-1
17	M7	L3X3X4	0.156	3.711	7	0.045	3.711	z	13	28304.144	46656	1688.138	3601.991	1.498	H2-1
18	M60	L3X3X4	0.146	4.058	6	0.033	5.565	z	13	23497.238	46656	1688.138	3503.629	1.5	H2-1
19	M15	L3X3X4	0.145	1.781	15	0.042	3.711	z	9	28304.144	46656	1688.138	3577.662	1.439	H2-1
20	M34	L3X3X4	0.143	0	13	0.014	0	y	13	23497.238	46656	1688.138	3503.629	1.5	H2-1
21	M17	L3X3X4	0.138	1.781	13	0.036	3.711	z	8	28304.144	46656	1688.138	3589.066	1.466	H2-1
22	M76	PIPE_2.0	0.134	3	4	0.045	4.5		15	20866.733	32130	1871.625	1871.625	1	H1-1b
23	M55	L3X3X4	0.128	0	8	0.041	0	z	8	23497.238	46656	1688.138	3503.629	1.5	H2-1
24	M28	L3X3X4	0.126	5.565	15	0.013	0	z	9	23497.238	46656	1688.138	3503.629	1.5	H2-1
25	M14	L3X3X4	0.117	2.161	10	0.004	4.415	z	7	30296.667	46656	1688.138	3473.168	1.136	H2-1
26	M32	L3X3X4	0.109	5.565	13	0.008	5.565	y	12	23497.238	46656	1688.138	3503.629	1.5	H2-1
27	M20	L3X3X4	0.105	2.161	7	0.004	4.415	z	4	30296.667	46656	1688.138	3473.168	1.136	H2-1
28	M6	L3X3X4	0.104	2.161	14	0.003	4.415	z	5	30296.667	46656	1688.138	3473.168	1.136	H2-1
29	M62	L3X3X4	0.103	0	4	0.021	0	z	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
30	M27	L3X3X4	0.099	1.507	6	0.021	0	y	12	23497.238	46656	1688.138	3503.629	1.5	H2-1
31	M49	L3X3X4	0.095	5.565	13	0.009	0	y	13	23497.238	46656	1688.138	3503.629	1.5	H2-1
32	M42	L3X3X4	0.094	0	15	0.009	5.565	y	8	23497.238	46656	1688.138	3503.629	1.5	H2-1
33	M30	L3X3X4	0.094	0	9	0.006	0	y	9	23497.238	46656	1688.138	3503.629	1.5	H2-1
34	M12	L3X3X4	0.094	2.161	10	0.003	4.415	z	14	30296.667	46656	1688.138	3473.168	1.136	H2-1
35	M48	L3X3X4	0.09	5.565	7	0.008	5.565	y	13	23497.238	46656	1688.138	3503.629	1.5	H2-1
36	M53	L3X3X4	0.089	0	22	0.012	0	z	22	23497.238	46656	1688.138	3503.629	1.5	H2-1
37	M85	PIPE_4.0	0.087	3.5	4	0.114	5		4	83097.932	93240	10631.25	10631.25	1	H1-1b
38	M22	L3X3X4	0.084	2.161	6	0.003	4.415	z	15	30296.667	46656	1688.138	3473.168	1.136	H2-1
39	M10	L3X3X4	0.083	2.161	12	0.003	4.415	z	15	30296.667	46656	1688.138	3473.168	1.136	H2-1
40	M2	L3X3X4	0.082	2.161	4	0.004	4.415	z	13	30296.667	46656	1688.138	3473.168	1.136	H2-1

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
41	M43	L3X3X4	0.081	5.565	8	0.007	0	y	8	23497.238	46656	1688.138	3503.629	1.5	H2-1
42	M4	L3X3X4	0.081	2.161	15	0.003	4.415	z	6	30296.667	46656	1688.138	3473.168	1.136	H2-1
43	M46	L3X3X4	0.079	5.565	10	0.008	5.565	y	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
44	M39	L3X3X4	0.078	5.565	11	0.005	0	y	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
45	M8	L3X3X4	0.078	2.161	13	0.004	4.415	z	10	30296.667	46656	1688.138	3473.168	1.136	H2-1
46	M50	L3X3X4	0.077	5.565	5	0.014	0	z	10	23497.238	46656	1688.138	3503.629	1.5	H2-1
47	M24	L3X3X4	0.075	2.161	4	0.003	4.415	z	8	30296.667	46656	1688.138	3473.168	1.136	H2-1
48	M41	L3X3X4	0.074	5.565	6	0.006	0	y	7	23497.238	46656	1688.138	3503.629	1.5	H2-1
49	M44	L3X3X4	0.072	5.565	4	0.005	5.565	y	4	23497.238	46656	1688.138	3398.265	1.284	H2-1
50	M18	L3X3X4	0.069	2.161	8	0.003	4.415	z	11	30296.667	46656	1688.138	3473.168	1.136	H2-1
51	M16	L3X3X4	0.067	2.161	9	0.003	4.415	z	6	30296.667	46656	1688.138	3473.168	1.136	H2-1
52	M45	L3X3X4	0.061	0	5	0.005	0	y	9	23497.238	46656	1688.138	3472.27	1.43	H2-1
53	M40	L3X3X4	0.059	0	13	0.004	5.565	y	11	23497.238	46656	1688.138	3503.629	1.5	H2-1
54	M58	L3X3X4	0.058	5.565	15	0.005	0	y	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
55	M56	L3X3X4	0.056	0	10	0.005	5.565	y	10	23497.238	46656	1688.138	3503.629	1.5	H2-1
56	M75	PIPE 2.0	0.053	1.5	9	0.054	3		10	25203.832	32130	1871.625	1871.625	1	H1-1b
57	M31	L3X3X4	0.053	0	5	0.005	0	y	11	23497.238	46656	1688.138	3503.629	1.5	H2-1
58	M47	L3X3X4	0.05	5.565	14	0.005	0	y	4	23497.238	46656	1688.138	3325.131	1.16	H2-1
59	M57	L3X3X4	0.05	0	10	0.005	0	y	4	23497.238	46656	1688.138	3503.629	1.5	H2-1
60	M61	L3X3X4	0.049	2.203	6	0.005	5.565	y	7	23497.238	46656	1688.138	3334.618	1.175	H2-1
61	M54	L3X3X4	0.048	5.565	6	0.005	0	y	7	23497.238	46656	1688.138	3411.201	1.308	H2-1
62	M59	L3X3X4	0.041	5.565	15	0.004	5.565	y	15	23497.238	46656	1688.138	3503.629	1.5	H2-1
63	M35	L3X3X4	0.04	0	15	0.006	0	y	4	23497.238	46656	1688.138	3337.422	1.18	H2-1
64	M52	L3X3X4	0.04	0	11	0.004	0	y	12	23497.238	46656	1688.138	3444.259	1.372	H2-1

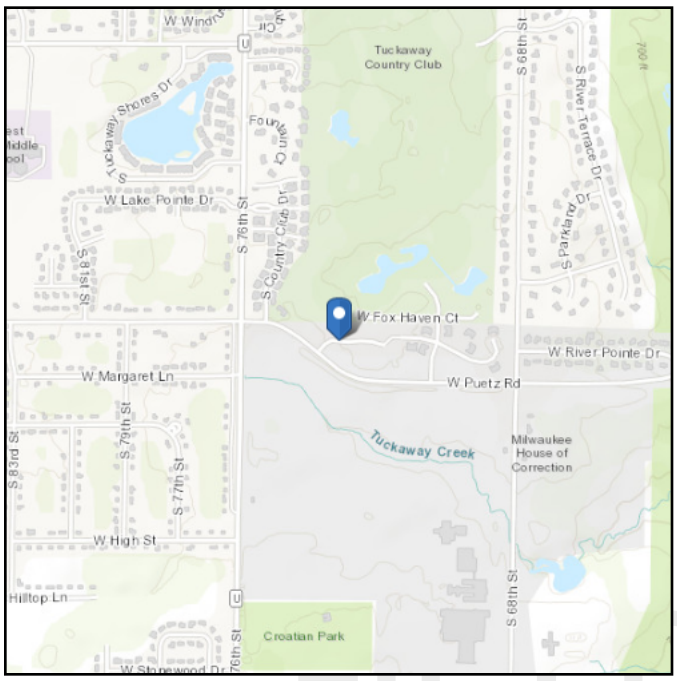
THE MAXIMUM MEMBER STRESS IS AT 92% OF ITS CAPACITY, THEREFORE, IT IS ADEQUATE TO SUPPORT THE PROPOSED UPGRADE.

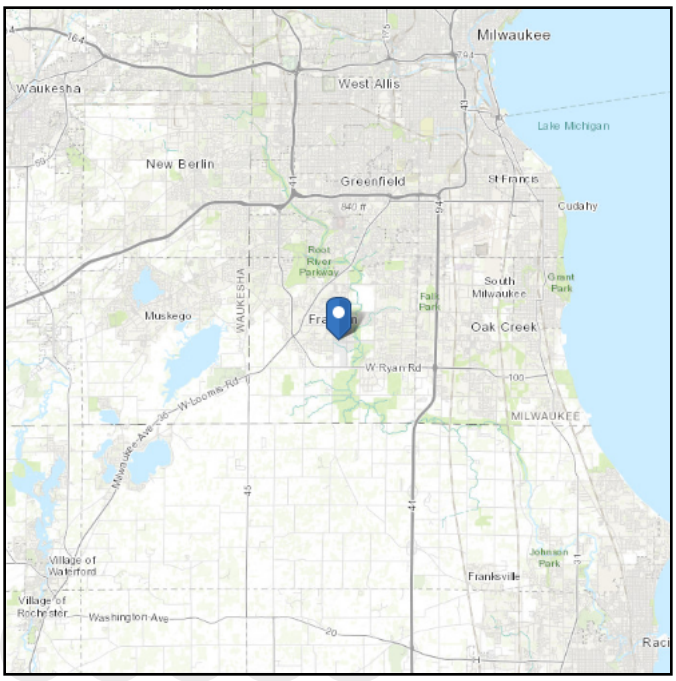
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Latitude: 42.886585
Longitude: -88.006368
Elevation: 763.2955660232263 ft (NAVD 88)





Wind

Results:

Wind Speed	120 Vmph
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

* CONVERTED TO NOMINAL WIND SPEED OF 93 MPH

Data Source: ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014
Date Accessed: Fri Sep 08 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

D - Stiff Soil

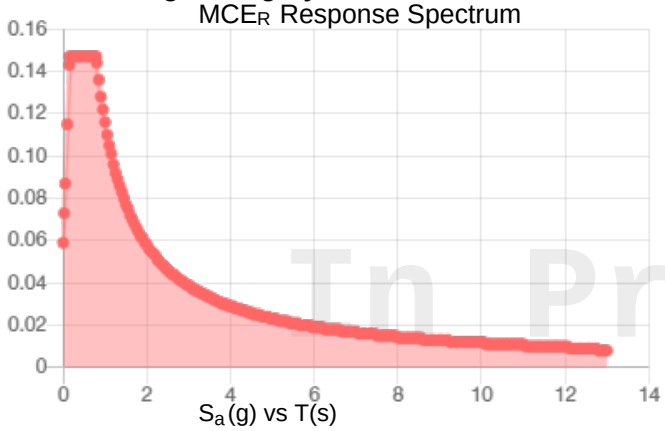
Site Soil Class:

Results:

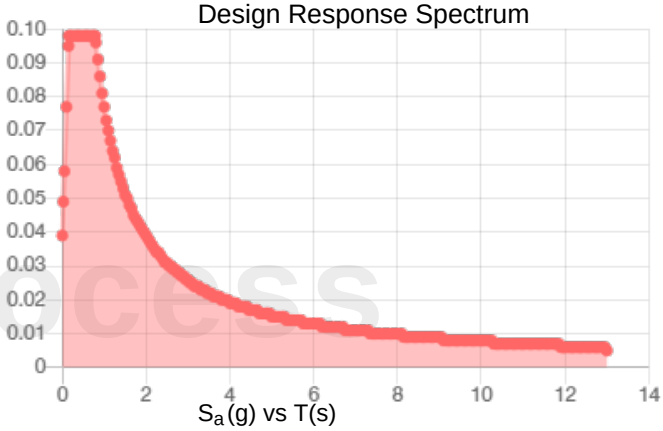
S_S :	0.092	S_{D1} :	0.077
S_1 :	0.048	T_L :	12
F_a :	1.6	PGA :	0.044
F_v :	2.4	PGA_M :	0.071
S_{MS} :	0.147	F_{PGA} :	1.6
S_{M1} :	0.116	I_e :	1.25
S_{DS} :	0.098		

Seismic Design Category: B

MCE_R Response Spectrum



Design Response Spectrum



Data Accessed: **Fri Sep 08 2023**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	-5 F
Gust Speed	40 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Fri Sep 08 2023

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

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

PROJECT MEMBERS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.
Tectonic Engineering & Surveying Consultants P.C.
Project Contact Info
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
(800) 829-6531
www.tectonicengineering.com

L3HARRIS™
1025 W. NASA BOULEVARD
MELBOURNE, FL 32919

SITE NAME

WFT

MILWAUKEE POLICE DEPARTMENT
NEW LAND MOBILE RADIO SYSTEM
SITE CONSTRUCTION DRAWINGS

PROJECT INFORMATION

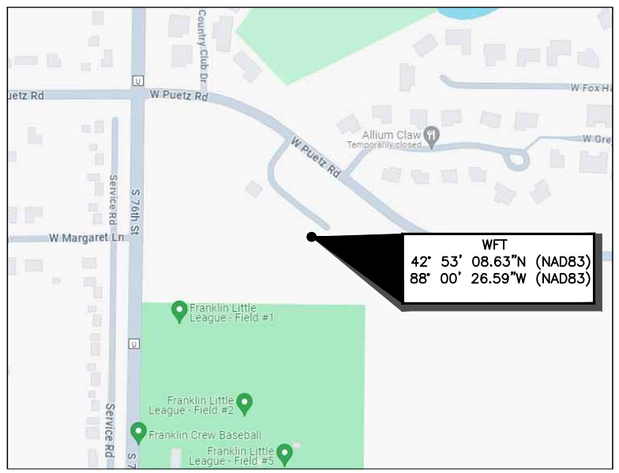
ADDRESS:	7401 W PUETZ ROAD MILWAUKEE WI 53132, USA
LATITUDE: LONGITUDE:	42° 53' 08.63"N (NAD83) 88° 00' 26.59"W (NAD83)
SITE ELEVATION:	748'-0"± AMSL
ANTENNA STATUS:	CO-LOCATION
JURISDICTION	
STATE:	WISCONSIN
COUNTY:	MILWAUKEE
MUNICIPALITY:	MILWAUKEE
PARCEL ID:	4989992000
PROPERTY OWNER:	TOWN OF MILWAUKEE
PROJECT ENGINEER:	TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C. 1279 ROUTE 300 NEWBURGH, NY 12550 CONTACT: EDWARD IAMICELI (845) 567-6656
CONSTRUCTION MANAGEMENT:	TONY CAUDILL L3HARRIS PROGRAM SERVICES -CIVILS TEL: (317) 489-7649 TONY.CAUDILL@LIVE.CO
POWER:	WE ENERGIES
TELCO:	WISCONSIN BELL, INC

SITE DIRECTIONS

DIRECTIONS FROM NEAREST AIRPORT (MKE)

HEAD EAST TOWARD S HOWELL AVE. USE THE LEFT 2 LANES TO TURN SLIGHTLY LEFT ONTO ARRIVALS / BAGGAGE CLAIM. CONTINUE ON WI-119 W TO YOUR DESTINATION IN FRANKLIN. KEEP LEFT TO CONTINUE ON WI-119 W. KEEP RIGHT TO STAY ON WI-119 W. USE THE LEFT LANE TO TAKE THE I-41 S/I-94 E EXIT TOWARD CHICAGO. MERGE WITH I-41/I-94 E. TAKE EXIT 321 FOR DREXEL AVE. KEEP RIGHT AT THE Y JUNCTION, FOLLOW SIGNS FOR DREXEL AVE W AND MERGE WITH W DREXEL AVE. AT THE ROUNDABOUT, CONTINUE STRAIGHT TO STAY ON W DREXEL AVE. TURN LEFT ONTO S 76TH ST. TURN LEFT ONTO W PUETZ RD. TURN RIGHT

VICINITY



DRAWING INDEX

NARRATIVE

EXISTING CONDITIONS:
EXISTING FACILITY CONSISTS OF AN EXISTING 165'-0" WATER TANK AND EXISTING EQUIPMENT IN A DESIGNATED EQUIPMENT SHELTER AT GRADE.

PROPOSED SCOPE:
THE PROPOSED SCOPE CONSISTS OF INSTALLATION OF NEW SHELTER AND GENERATOR ON CONCRETE SLAB AT GRADE LEVEL. REPLACING (2) EXISTING ANTENNA WITH TWO NEWER ANTENNAS (ONE (1) Rx AND ONE (1) Tx) ALONG WITH (1) TTA ON TWO (2) NEW STANDOFF MOUNTS. IN ADDITION, ONE (1) MICROWAVE DISHES ARE BEING INSTALLED ON THE TOWER AND (1) 1-5/8" DIA, (1) 7/8" DIA, (1) 1/2" DIA, AND (1) CNT 400 ARE INSTALLED AND ROUTED UP TO THE ANTENNAS. NEW EQUIPMENT RACKS TO BE INSTALLED IN NEW EQUIPMENT SHELTER AND A GENERATOR TO BE INSTALLED ON A CONCRETE PAD.

PROJECT DESCRIPTION
MILWAUKEE, WI POLICE DEPARTMENT IS INSTALLING A NEW LAND MOBILE RADIO SYSTEM FOR THE MILWAUKEE-PD COMMUNICATIONS NEEDS. THE NEW METROPOLITAN REGIONAL RADIO SYSTEM (MRRS) WILL IMPROVE THE PUBLIC SAFETY COMMUNICATIONS FOR THOSE OFFICERS PATROLLING THE CITY.

CALL BEFORE YOU DIG
WISCONSIN 811

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE

749 W. STATE STREET,
MILWAUKEE, WI 53233

L3HARRIS™
1025 W. NASA BOULEVARD
MELBOURNE, FL 32919

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.
Tectonic Engineering & Surveying Consultants P.C.
Project Contact Info
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
(800) 829-6531
www.tectonicengineering.com

PROJECT NUMBER	DESIGNED BY
12228.10 WFT	EI

REV	DATE	REVISION	DRAWN BY
A	04/25/2024	ISSUED FOR COMMENT	VM
B	05/07/2024	PER CLIENT COMMENTS	SB
C	05/28/2024	PER CLIENT COMMENTS	SB
D	05/29/2024	PER CLIENT COMMENTS	SB

ISSUED BY | DATE

WISCONSIN
EDWARD N. IAMICELI
E-47180-6
NEWBURGH, NY
PROFESSIONAL ENGINEER

SITE INFORMATION

WFT

7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE

TITLE SHEET &
PROJECT INFORMATION

SHEET NUMBER

T-1

STANDARDS & CODES (AS APPLICABLE)

THE MRRS SHALL BE DESIGNED, CONSTRUCTED, INSTALLED AND TESTED USING INDUSTRY RECOGNIZABLE STANDARDS. THE GENERAL CONTRACTOR SHALL USE THESE STANDARDS IN EVERY ASPECT OF THEIR PROVISION OF THE MRRS AND IN THE DEVELOPMENT OF ALL DELIVERABLES REFERENCED HEREIN. THE STANDARDS REQUIRED FOR REFERENCE SHALL BE OF THE LATEST VERSION. A FULL LIST OF STANDARDS IS PROVIDED AS PART OF THE TERMS AND CONDITIONS OF THE CONTRACT. THE GENERAL CONTRACTOR IS REQUIRED TO COMPLY WITH THE FOLLOWING STANDARDS (MINIMUM):

1. HARRIS AE–LZT123–4618–1 GROUNDING SPECIFICATION
2. ANSI A10.14 REQUIREMENTS FOR SAFETY BELTS, HARNESSES, LANYARDS, AND LIFELINES FOR CONSTRUCTION AND DEMOLITION USE
3. ANSI C62.1 SURGE ARRESTERS FOR AC POWER CIRCUITS
4. ANSI–J–STD–607–A–2002 COMMERCIAL BUILDING GROUNDING (EARTHING) AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
5. ANSI T1–313–2003 ELECTRICAL PROTECTION FOR TELECOMMUNICATIONS CENTRAL OFFICES AND SIMILAR TYPE FACILITIES
6. ANSI T1.333–2001 GROUNDING AND BONDING OF TELECOMMUNICATIONS EQUIPMENT
7. ANSI T1.334–2002 ELECTRICAL PROTECTION OF COMMUNICATIONS TOWERS AND ASSOCIATED STRUCTURES
8. ANSI Z359 REQUIREMENTS FOR PERSONAL FALL ARREST SYSTEMS, SUBSYSTEMS AND COMPONENTS
9. ANSI/IEEE C95.1 SAFETY LEVELS WITH RESPECT TO HUMAN EXPOSURE TO RADIO FREQUENCY ENERGY
10. ANSI/TIA/EIA–568–A COMMERCIAL BUILDING TELECOMMUNICATIONS CABLING STANDARD
11. ANSI/TIA/EIA–569–A COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATIONS PATHWAYS AND SPACES
12. ANSI/TIA/EIA–606 ADMINISTRATION STANDARD FOR THE TELECOMMUNICATIONS INFRASTRUCTURE OF COMMERCIAL BUILDINGS
13. ANSI/TIA/EIA–607 COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
14. ANSI/UL 299 DRY CHEMICAL FIRE EXTINGUISHERS
15. ANSI/UL 711, CAN/ULC–S508–M90 FIRE EXTINGUISHERS, RATING AND FIRE TESTING OF
16. AS 3516.2–1998 SITTING OF RADIO COMMUNICATIONS FACILITIES – GUIDELINES FOR FIXED, MOBILE AND BROADCASTING SERVICES OPERATING AT FREQUENCIES ABOVE 30 MHZ
17. ASTM A615–68 SPECIFICATIONS FOR DEFORMATION OF PREFORMED STEEL BARS FOR CONCRETE REINFORCEMENT
18. BS 6651:1999 CODE OF PRACTICE FOR PROTECTION OF STRUCTURES AGAINST LIGHTNING
19. BS 7430:1998 CODE OF PRACTICE FOR EARTHING
20. CODE OF FEDERAL REGULATIONS 47 PART 17 – CONSTRUCTION, MARKING, AND LIGHTING OF ANTENNA STRUCTURES
21. FAA ADVISORY CIRCULAR 70/7460–1G OBSTRUCTION MARKING AND LIGHTING
22. FAA–STD–019D–2002 LIGHTNING AND SURGE PROTECTION, GROUNDING, BONDING AND SHIELDING REQUIREMENTS FOR FACILITIES AND ELECTRONIC EQUIPMENT
23. FCC/OET RTA 95–01 (NTIS ORDER NO. PB95–253829) ENGINEERING SERVICES FOR MEASUREMENT AND ANALYSIS OF RADIO FREQUENCY (RF) FIELDS
24. IEC 60364–1 ELECTRICAL INSTALLATIONS OF BUILDINGS
25. IEC 61024–1–2 PROTECTION OF STRUCTURES AGAINST LIGHTNING
26. IEEE C62.41 IEEE RECOMMENDED PRACTICE ON SURGE VOLTAGES IN LOW–VOLTAGE AC POWER CIRCUITS.
27. IEEE C62.45 GUIDE ON SURGE TESTING FOR EQUIPMENT CONNECTED TO LOW–VOLTAGE AC POWER CIRCUITS
28. IEEE STD 142–1991 (IEEE GREEN BOOK) RECOMMENDED PRACTICE FOR GROUNDING OF INDUSTRIAL AND COMMERCIAL POWER SYSTEMS
29. IEEE STD 519–1992 RECOMMENDED PRACTICES AND REQUIREMENTS FOR HARMONIC CONTROL IN ELECTRICAL POWER SYSTEMS
30. IEEE STD 1100–1999 RECOMMENDED PRACTICE FOR POWERING AND GROUNDING ELECTRONIC EQUIPMENT
31. ISO/TC94/SC4 PERSONAL EQUIPMENT FOR PROTECTION AGAINST FALLS (INTERNATIONAL ISO STANDARD)
32. MIL–HDBK–419A GROUNDING, BONDING, AND SHIELDING FOR ELECTRONIC EQUIPMENTS AND FACILITIES
33. MIL–STD–188–124B GROUNDING, BONDING AND SHIELDING FOR COMMON LONG HAUL/TACTICAL COMMUNICATIONS SYSTEMS INCLUDING GROUND BASED COMMUNICATIONS ELECTRONIC FACILITIES AND EQUIPMENTS
34. NECA/BICSI 568–2001 INSTALLING COMMERCIAL BUILDING TELECOMMUNICATIONS CABLING
35. NEMA/ANSI Z535.3 CRITERIA FOR SAFETY SYMBOLS
36. NFPA 1 FIRE PREVENTION CODE
37. NFPA 10 STANDARD FOR PORTABLE FIRE EXTINGUISHERS
38. NFPA 12 STANDARD FOR CO2 EXTINGUISHING SYSTEMS
39. NFPA 13 STANDARD FOR INSTALLATION OF SPRINKLER SYSTEM
40. NFPA 17 STANDARD FOR DRY CHEMICAL EXTINGUISHING SYSTEM
41. NFPA 33 STANDARD FOR SPRAY APPLICATION USING FLAMMABLE OR COMBUSTIBLE MATERIALS
42. NFPA 70–2011 NATIONAL ELECTRICAL CODE & INTERNATIONAL ELECTRICAL CODE® SERIES
43. NFPA 101 LIFE SAFETY CODE
44. NFPA 111 STANDARD ON STORED ELECTRICAL ENERGY, EMERGENCY AND STANDBY POWER SYSTEMS
45. NFPA 780–2004 STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS
46. NWSM 30–4106–2004 LIGHTING PROTECTION, GROUNDING, BONDING, SHIELDING, AND SURGE PROTECTION REQUIREMENTS
47. OSHA 1926.104 SAFETY EQUIPMENT
48. TIA/EIA–222–G STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES
49. TSB–88.1–C, WIRELESS COMMUNICATIONS SYSTEMS PERFORMANCE IN NOISE–LIMITED SITUATIONS, PART 1: RECOMMENDED METHODS FOR TECHNOLOGY–INDEPENDENT PERFORMANCE MODELING
50. UL 467–2004 GROUNDING AND BONDING EQUIPMENT
51. UL 497A SECONDARY PROTECTORS FOR COMMUNICATIONS CIRCUITS
52. UL 1449 TRANSIENT VOLTAGE SURGE SUPPRESSORS
53. ULC–S504–77 STANDARD FOR DRY CHEMICAL FIRE EXTINGUISHERS
54. UNIFORM BUILDING CODE ARTICLES 2330 THROUGH 2338 ARTICLE 1807 (C), (K), CHAPTER 23 ARTICLE 2370
55. UNITED STATES NATIONAL WEATHER SERVICE MANUAL 30–4106–2004 LIGHTNING PROTECTION, GROUNDING, BONDING, SHIELDING, AND SURGE PROTECTION REQUIREMENTS.

GENERAL NOTES

1. GENERAL CONTRACTOR MUST COMPLY WITH HARRIS SAFETY, HEALTH & ENVIRONMENTAL CONTROL PLAN (FHECP), QUALITY PLAN, & SECURITY PLAN.
2. IT IS THE INTENTION OF THESE DRAWINGS TO SHOW THE COMPLETED INSTALLATION. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY BRACING, SHORING, TIES, FORM WORK, ETC., IN ACCORDANCE WITH ALL NATIONAL, STATE, AND APPROPRIATE JURISDICTION ORDINANCES, TO SAFELY EXECUTE ALL WORK AND SHALL BE RESPONSIBLE FOR SAME. ALL WORK SHALL BE IN ACCORDANCE WITH APPROPRIATE JURISDICTION CODES.
3. SITE GROUNDING SHALL COMPLY WITH MOST STRINGENT OF HARRIS GROUNDING STANDARD(AE–LZT123–4618–1), AND WHEN NATIONAL JURISDICTION GROUNDING CODES APPLICABLE. GROUNDING SHALL BE COMPLETED BEFORE ERECTION OF NEW EQUIPMENT.
4. ALL WORK SHALL COMPLY WITH OSHA AND STATE SAFETY REQUIREMENTS. PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXIST CONSTRUCTION, AND UTILITIES SHALL BE ESTABLISHED PRIOR TO FOUNDATION INSTALLATION. IF TEMPORARY LIGHTING AND MARKING IS REQUIRED BY THE FEDERAL AVIATION ADMINISTRATION (FAA), IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE NECESSARY LIGHTS AND NOTIFY THE PROPER AUTHORITIES IN THE EVENT OF A PROBLEM.
5. ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH ALL APPROPRIATE JURISDICTION, STATE, AND FEDERAL CODES OR ORDINANCES. THE MOST STRINGENT CODE WILL APPLY IN THE CASE OF DISCREPANCIES OR DIFFERENCES IN THE CODE REQUIREMENTS.
6. ANY DAMAGE TO ADJACENT PROPERTIES WILL BE CORRECTED AT THE GENERAL CONTRACTOR'S EXPENSE.
7. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING AMPLE NOTICE TO THE AUTHORITY TO SCHEDULE THE REQUIRED INSPECTIONS. A MINIMUM OF 24 HOURS OF NOTICE BEFORE BEGINNING OF EVERY PHASE OF CONSTRUCTION SHOULD BE GIVEN AND THE APPROPRIATE AUTHORITY HAVE REQUESTED THAT GROUPS OF TWO OR THREE SITES BE SCHEDULED AT ONE TIME IF POSSIBLE.
8. THE COMPLETE BID PACKAGE INCLUDES THESE CONSTRUCTION DRAWINGS ALONG WITH THE SPECIFICATIONS. GENERAL CONTRACTOR IS RESPONSIBLE FOR REVIEW OF THE TOTAL BID PACKAGE PRIOR TO BID SUBMITTAL.
9. THE GENERAL CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EXIST UTILITIES WITHIN THE CONSTRUCTION LIMITS PRIOR TO CONSTRUCTION.
10. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR MAINTAINING POSITIVE DRAINAGE ON THE SITE AT ALL TIMES. SILT AND EROSION CONTROL SHALL BE MAINTAINED ON THE DOWNSTREAM SIDE OF THE SITE AT ALL TIMES. ANY DAMAGE TO ADJACENT PROPERTIES WILL BE CORRECTED AT THE GENERAL CONTRACTOR'S EXPENSE.
11. CLEARING OF TREES AND VEGETATION ON THE SITE SHOULD BE KEPT TO A MINIMUM. ONLY THE TREES NECESSARY FOR CONSTRUCTION OF THE FACILITIES SHALL BE REMOVED. ANY DAMAGE TO PROPERTY OUTSIDE THE LEASED PROPERTY SHALL BE REPAIRED BY THE GENERAL CONTRACTOR.
12. ALL SUITABLE BORROW MATERIAL FOR BACKFILL OF THE SITE SHALL BE INCLUDED IN THE BID. EXCESS TOPSOIL AND UNSUITABLE MATERIAL SHALL BE DISPOSED OF OFF SITE AT LOCATIONS APPROVED BY GOVERNING AGENCIES PRIOR TO DISPOSAL.
13. SEEDING AND MULCHING OF THE SITE WILL BE ACCOMPLISHED AS SOON AS POSSIBLE AFTER COMPLETION OF THE SITE DEVELOPMENT. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING AN ADEQUATE COVER OF VEGETATION OVER THE SITE FOR A ONE YEAR PERIOD.
14. RECORD DRAWINGS: MAINTAIN A RECORD OF ALL CHANGES, SUBSTITUTIONS, ETC., BETWEEN THE WORK AS SPECIFIED AND INSTALLED. RECORD CHANGES ON A CLEAN SET OF CONTRACT DRAWINGS WHICH SHALL BE TURNED OVER TO THE CONSTRUCTION MANAGER UPON COMPLETION OF THE PROJECT.
15. THE GENERAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED LICENSES, FEES, INSPECTIONS, & PERMITS, ETC...
16. APPROVAL OF THESE PLANS DOES NOT CONSTITUTE APPROVAL BY MTA OF ANY LAND DISTURBING ACTIVITIES WITHIN WETLAND AREAS. IT IS THE RESPONSIBILITY OF THE PROPERTY OWNER TO CONTACT THE APPROPRIATE REGULATORY AGENCY FOR APPROVAL OF WETLAND DISTURBANCE.
17. THE PROFESSIONAL WHO SEALS THIS PLAN CERTIFIES UNDER PENALTY OF LAW THAT THIS PLAN WAS PREPARED AFTER A SITE VISIT TO THE LOCATIONS DESCRIBED HEREIN BY MYSELF OR MY AUTHORIZED AGENT, UNDER MY DIRECT SUPERVISION.
18. HIGH INTENSITY LIGHTING FACILITIES SHALL BE SO ARRANGED THAT THE SOURCE OF ANY LIGHT IS CONCEALED FROM PUBLIC VIEW AND FROM ADJACENT RESIDENTIAL PROPERTY AND DOES NOT INTERFERE WITH TRAFFIC.
19. NO OUTSIDE STORAGE PROPOSED. THIS INCLUDES SUPPLIES, EQUIPMENT, VEHICLES, PRODUCTS, ETC.
20. ALL CONSTRUCTION TO COMPLY WITH APPLICABLE CODES.
21. NO CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL ALL SITE IMPROVEMENTS HAVE BEEN COMPLETED.
22. GENERAL CONTRACTOR SHALL SCHEDULE A PRE–CONSTRUCTION MEETING PRIOR TO THE START OF ANY CONSTRUCTION, IF REQUIRED BY APPROPRIATE AUTHORITY.
23. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE GOVERNING APPLICABLE CODES.
24. SHELTER TO BE ANCHORED TO CONCRETE PAD IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION – SHIMS MAY BE NEEDED.
25. IF MAST FOR ELECTRIC IS REQUIRED, CONFIRM ATS TO MAST INTERFACE BEFORE CONSTRUCTION.

HAZARDOUS MATERIAL NOTE

FOR GOVERNMENT COLLOCATED AND COMMERCIALLY OWNED PROPOSED MRRS SITES, GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING HAZARDOUS CONDITIONS TO HARRIS CORPORATION, AND TO THE APPROPRIATE JURISDICTION, GOVERNMENT OR THIRD PARTY OWNER, AS WELL AS TO ANY OTHER ENTITIES AS REQUIRED BY LAW.

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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www.tectonicengineering.com

PROJECT NUMBER	DESIGNED BY
12228.10 WFT	EI

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E-47180-6
NEWBURGH, NY
PROFESSIONAL ENGINEER

SITE INFORMATION

WFT

7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE

CODES &
GENERAL NOTES

SHEET NUMBER

T–2

NOTE: FOR CLARITY, NOT ALL SITE FEATURES ARE SHOWN.

1 / C-1 OVERALL SITE PLAN

SCALE: 1/64" = 1'-0"

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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SHEET TITLE

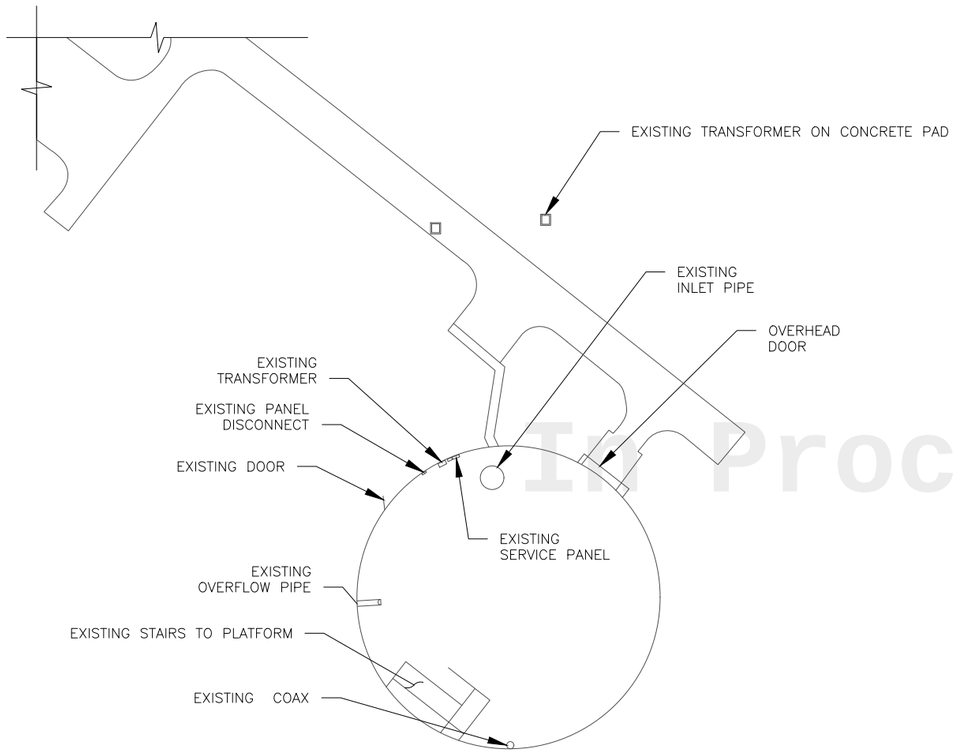
OVERALL SITE PLAN

SHEET NUMBER

C-1

N

APPROX



1 / C-2A PARTIAL SITE PLAN (EXISTING)

SCALE: 1/32" = 1'-0"

0 1 2 3

ORIGINAL SIZE IN INCHES

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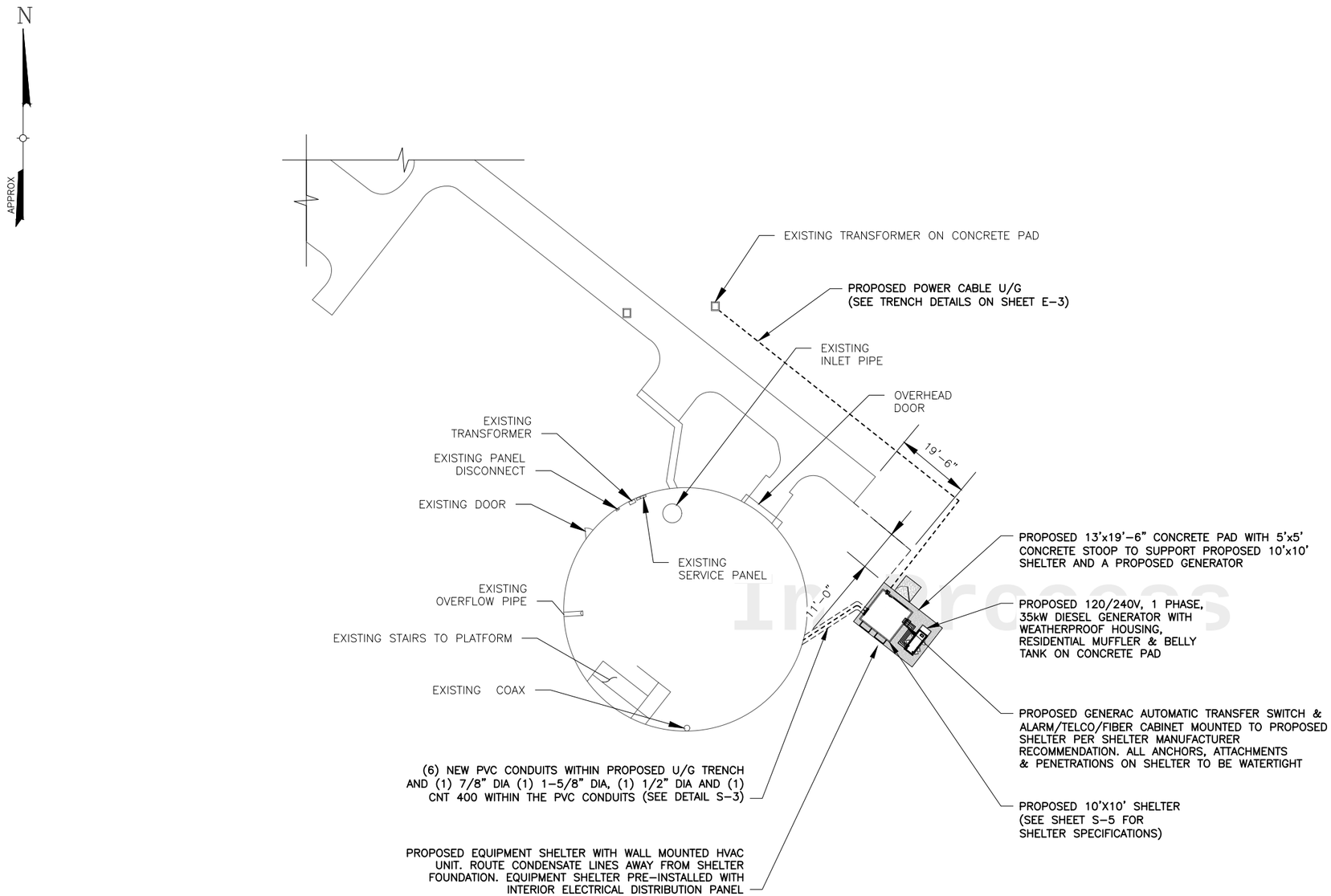
SHEET TITLE

ENLARGED EQUIPMENT ROOM PLANS

SHEET NUMBER

C-2A



1 / C-2B PARTIAL SITE PLAN (PROPOSED)

SCALE: 1/32" = 1'-0"

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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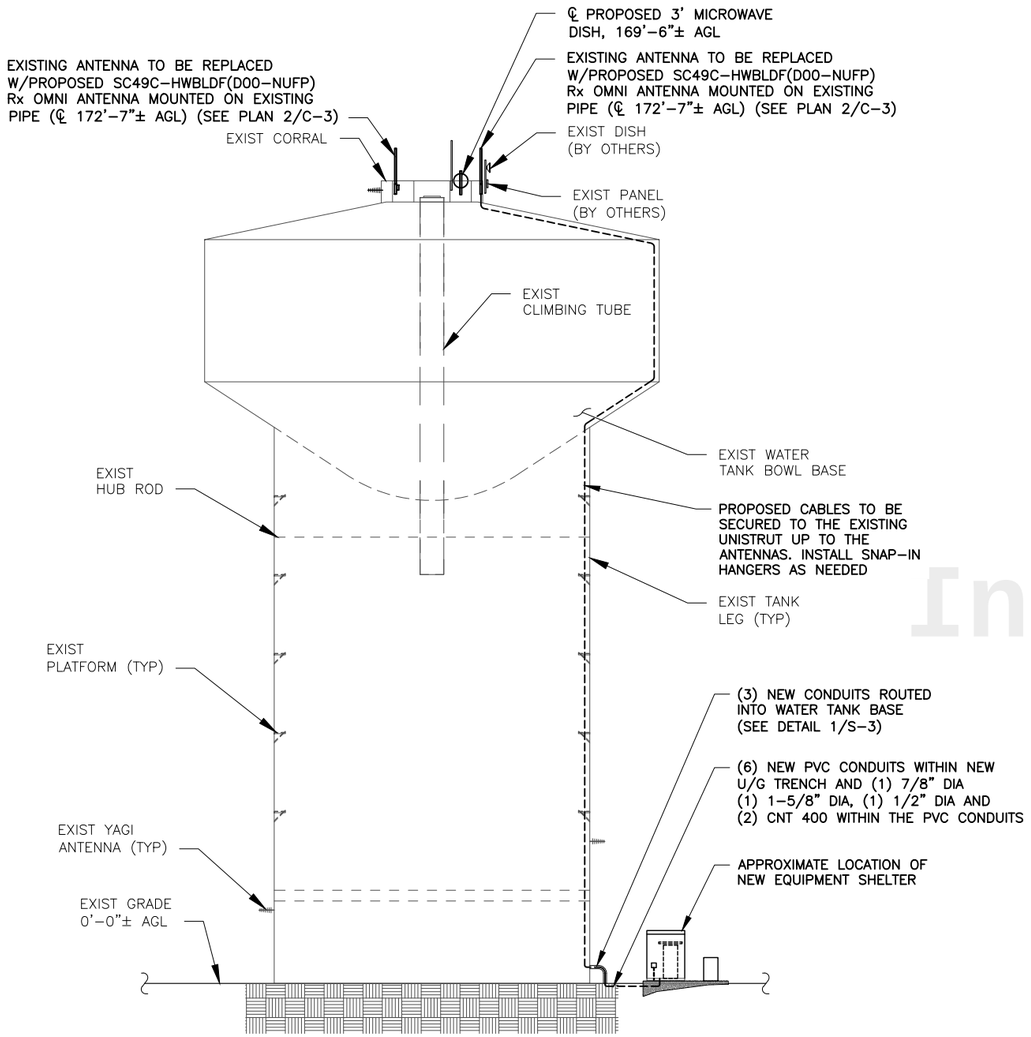
SHEET TITLE

ENLARGED EQUIPMENT ROOM PLANS

SHEET NUMBER

C-2B



NOTE: FOR CLARITY, NOT ALL ANTENNAS, ANTENNA EQUIPMENT, AND ANTENNA CABLES ARE SHOWN. ORIENTATION OF MOUNTS ARE SKEWS FOR CLARITY.

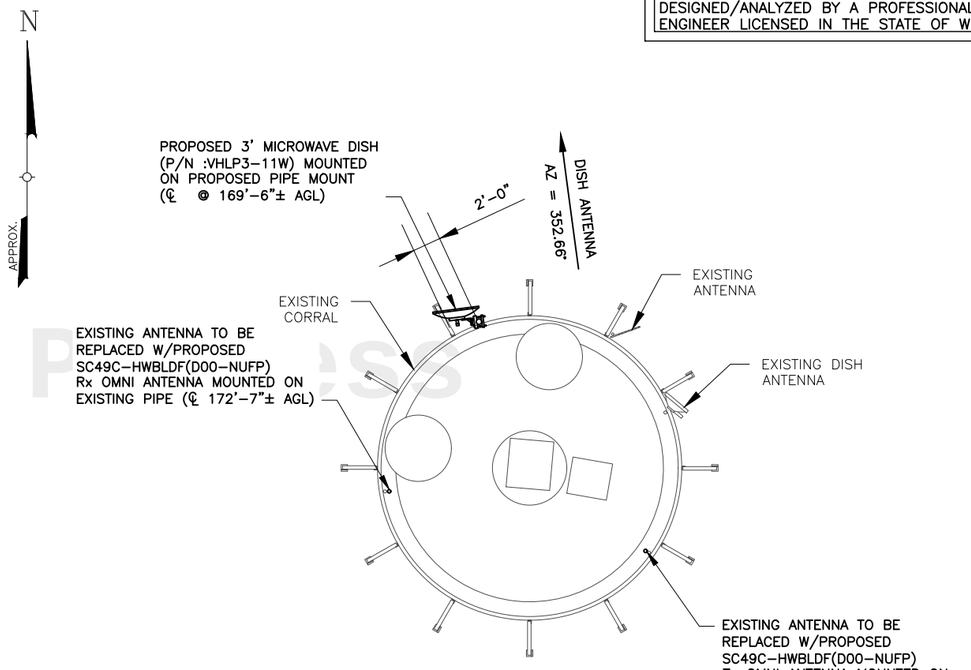
1 / C-3 ELEVATION

SCALE: 1/32" = 1'-0"

PROPOSED ANTENNA/CABLE CONFIGURATION SCHEDULE

PLATFORM MOUNT CENTER	ANTENNA RAD CENTER	AZIMUTH (DEGREES)	QUANTITY	TYPE	EQUIPMENT	MOUNT	FEED LINE TYPE	FEED LINE LENGTH
167'-0"±	172-7"±	0°	1	Rx	SC499-HWBLDF (D00-NUFP)	6' STANDOFF MOUNT	7/8" COAX	230'±
167'-0"±	167'-0"±	0°	1	TTA	DS3210	6' STANDOFF MOUNT	1/2" COAX	230'±
167'-0"±	172'-7"±	0°	1	Tx	SC499-HWBLDF (D00-NUFP)	6' STANDOFF MOUNT	1-5/8" COAX	210'±
169'-6"	169'-6"	352.66°	1	DISH	VHLP3-11W-GT1A	CHAIN MOUNT	CNT 400	220'±

STRUCTURAL NOTE:
REFER TO THE TOWER STRUCTURAL ANALYSIS PREPARED BY TECTONIC, DATED 1/12/24. PROPOSED MOUNT SHALL BE DESIGNED/ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WISCONSIN.



2 / C-3 ANTENNA PLAN

SCALE: 3/32" = 1'-0"

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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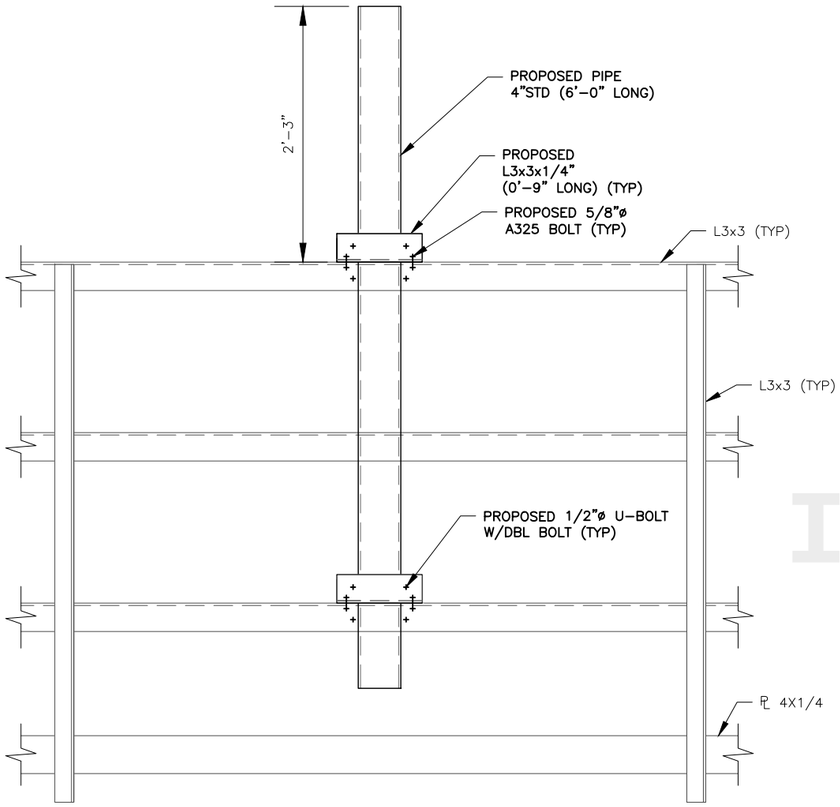
SHEET TITLE

ELEVATION, ANTENNA PLAN & CHART

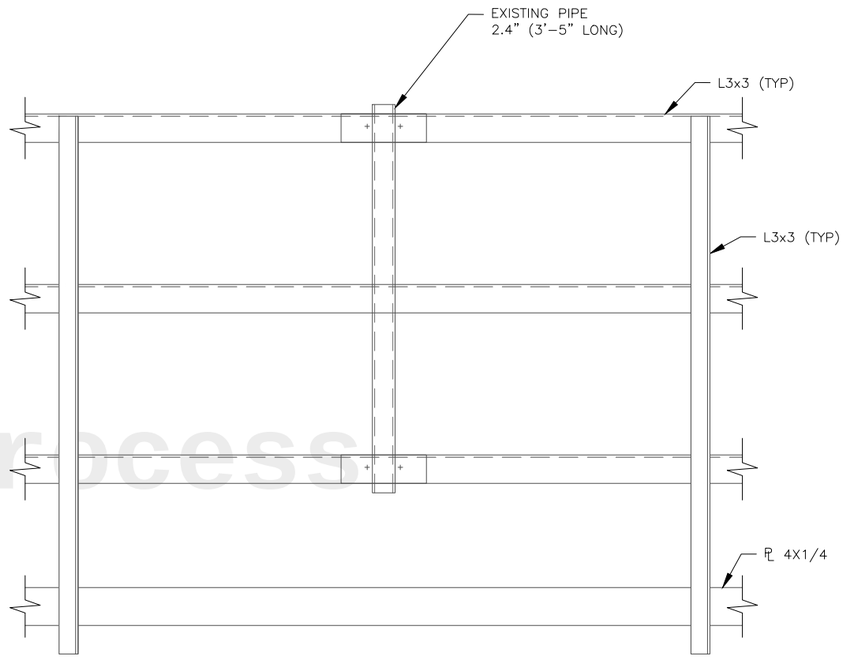
SHEET NUMBER

C-3



1 / C-4 MW MOUNT DETAIL

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



2 / C-4 OMNI MOUNT DETAIL

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

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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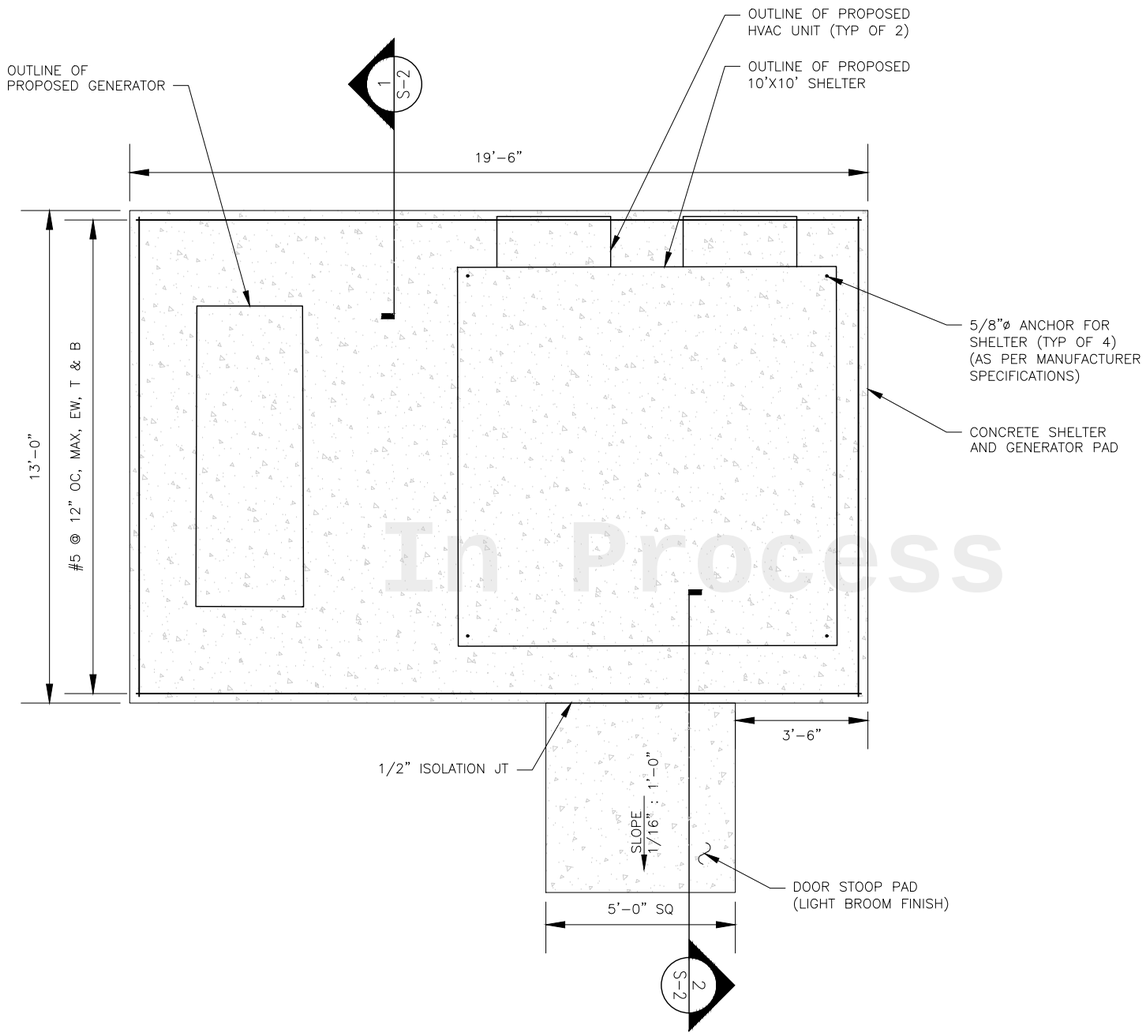
SHEET TITLE

MOUNTING DETAILS

SHEET NUMBER

C-4



NOTES:
1. STOOP PAD LOCATION VARIES. CONTRACTOR SHALL COORDINATE LOCATION WITH SHELTER MANUFACTURER PRIOR TO CONSTRUCTION.
2. MAINTAIN A MINIMUM OF 6" EDGE DISTANCE FOR SHELTER ANCHORS.

1 / S-1 SHELTER AND GENERATOR SLAB PLAN

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

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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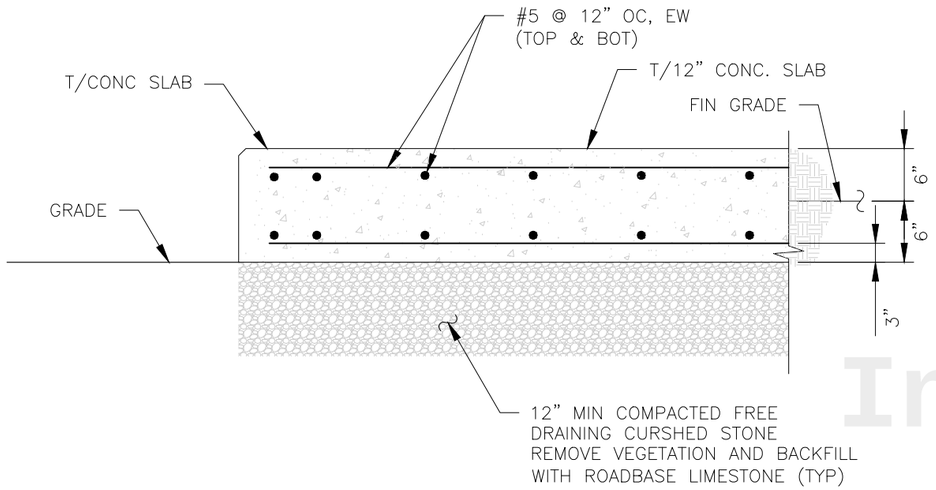
SHEET TITLE

SLAB PLAN DETAILS

SHEET NUMBER

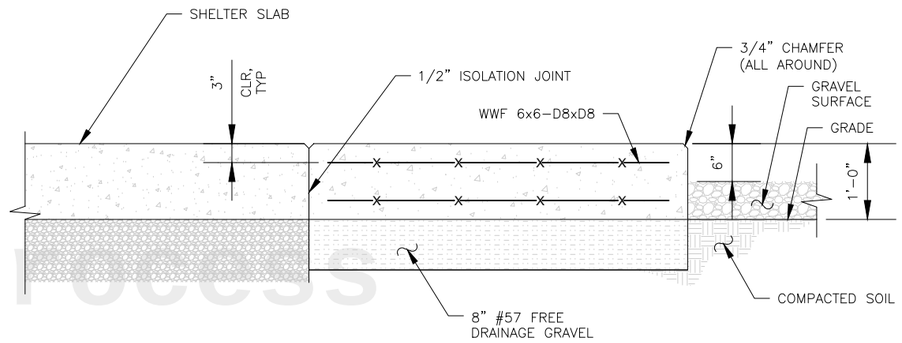
S-1



NOTE: OVER EXCAVATION REQUIRED ONLY IF POOR SOILS ENCOUNTERED AT 3'–0" BELOW GRADE. TO BE VERIFIED IN FIELD PRIOR TO CONSTRUCTION.

1 / S–2 SHELTER AND GENERATOR SLAB SECTION

SCALE: 3/4" = 1'–0"



2 / S–2 STOOP SLAB SECTION

SCALE: 1/2" = 1'–0"

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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SHEET TITLE

SLAB SECTION DETAILS

SHEET NUMBER

S–2

CONCRETE NOTES

1. DESIGN AND CONSTRUCTION SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" ACI 318, LATEST EDITION AND SECTION 1901.5 OF THE BUILDING CODE.
2. CONCRETE REQUIREMENTS:

	SLABS
MINIMUM COMPRESSIVE STRENGTH (f'c)	3000 PSI @ 28 DAYS (MINIMUM)
CEMENT (ASTM C150)	TYPE I/II
COARSE AGGREGATE (ASTM C33)	#67 STONE
FINE AGGREGATE	ASTM C33
CURING	LIQUID MEMBRANE (ASTM C309, TYPE II, CLASS A)
TEST CYLINDERS REQUIRED	3 PER 50 CY

   CONCRETE FOR EXTERIOR SLABS SHALL HAVE AN AIR ENTRAINMENT OF 6%±.
3. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, "DEFORMED AND PLAIN BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", GRADE 60.
4. CONCRETE WORK AND MATERIALS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "SPECIFICATIONS FOR STRUCTURAL CONCRETE", ACI 301.
5. CONCRETE COVER FOR REINFORCING SHALL BE 3 INCHES FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH. AT ALL OTHER CONCRETE SURFACES, MINIMUM COVER SHALL BE 2 INCHES FOR #6 AND LARGER BARS, AND 1 1/2 INCHES FOR #5 AND SMALLER BARS, UNLESS OTHERWISE NOTED. CONCRETE COVER FOR REINFORCEMENT NOT EXPOSED TO EARTH OR WEATHER SHALL BE 3/4" FOR SLABS, WALLS, AND JOISTS, UNLESS OTHERWISE NOTED.
6. WELDING OF REINFORCING STEEL IS SPECIFICALLY PROHIBITED.
7. GROUT SHALL BE NON-METALLIC, NON-SHRINK PREPACKAGED GROUT WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT 28 DAYS.
8. ALL REINFORCING, EMBEDDED STEEL, ANCHOR BOLTS, INSERTS AND ALL OTHER EMBEDDED ITEMS SHALL BE IN PLACE BEFORE START OF CONCRETE PLACEMENT. PROVIDE TEMPLATES FOR SETTING OF ANCHOR BOLTS.
9. HOT WEATHER CONCRETING SHALL CONFORM TO ACI 305 "HOT WEATHER CONCRETING".
10. COLD WEATHER CONCRETING SHALL CONFORM TO ACI 306 "COLD WEATHER CONCRETING".
11. THE TOP OF ALL CONCRETE SURFACES SHALL BE TRUE AND LEVEL WITH A SMOOTH FLOAT FINISH, UNLESS OTHERWISE NOTED. FLOOR SLAB SHALL RECEIVE A STEEL TROWEL FINISH. ALL DIMENSIONS SHALL BE WITHIN + OR - 1/8 INCH.
12. REMOVE ALL LOOSE MATERIAL AND DEBRIS FROM EXISTING SURFACE PRIOR TO PLACING CONCRETE.
13. DO NOT REMOVE FORMS, SHORES AND BRACING UNTIL CONCRETE HAS GAINED SUFFICIENT STRENGTH TO CARRY ITS OWN WEIGHT, CONSTRUCTION LOADS, AND DESIGN LOADS WHICH ARE LIABLE TO BE IMPOSED UPON IT. VERIFY STRENGTH OF CONCRETE BY COMPRESSIVE TEST RESULTS.
14. THROUGHOUT CONSTRUCTION, THE CONCRETE WORK SHALL BE ADEQUATELY PROTECTED AGAINST DAMAGE DUE TO EXCESSIVE LOADING, CONSTRUCTION EQUIPMENT, MATERIALS OR METHODS, ICE, RAIN, SNOW, EXCESSIVE HEAT AND FREEZING.
15. DRYING OUT OF CONCRETE, ESPECIALLY DURING THE FIRST 24 HOURS, SHALL BE CAREFULLY GUARDED AGAINST. ALL SURFACES SHALL BE MOIST CURED.
16. FORMS SHALL BE BUILT TRUE. THEY SHALL BE STRONG, RIGID, MORTAR-TIGHT, AND ADEQUATELY BRACED OR TIED. FORMS SHALL BE DESIGNED AND CONSTRUCTED TO WITHSTAND ALL LOADS AND PRESSURES, INCLUDING THOSE IMPOSED BY PLASTIC CONCRETE TAKING FULL ACCOUNT OF THE STRESSES DUE TO THE RATE OF POUR, EFFECTIVE VIBRATION AND CONDITIONS BROUGHT ABOUT BY CONSTRUCTION METHODS.
17. PROVIDE 48 HOURS NOTICE TO THE ENGINEER PRIOR TO EACH PLACEMENT OF CONCRETE.
18. ALL CONCRETE WORK SHALL BE SUBJECT TO SPECIAL INSPECTIONS DURING CONSTRUCTION (SEE SHEET S-4).

EARTHWORK NOTES

1. ALL EXCAVATIONS SHALL BE DEWATERED BY SUMPING, PUMPING, ETC. IN A MANNER WHICH WILL NOT LOOSEN FOUNDATION SUBGRADE MATERIAL. SURFACE WATER SHALL BE DIVERTED AWAY FROM EXCAVATIONS BY MEANS OF BERMS, DIVERSION DITCHES, OR OTHER SUITABLE METHODS.
2. CONFINED EXCAVATIONS FOR FOUNDATIONS, UTILITIES, ETC. SHALL BE LIMITED TO 4 FT. IN DEPTH UNLESS SHORING AND BRACING ARE USED. TRENCH EXCAVATION GEOMETRY AND/OR BRACING SHALL CONFORM WITH LATEST OSHA REQUIREMENTS.
3. REMOVE UNSUITABLE MATERIALS AND PROOFROLL OR OTHERWISE COMPACT SUBGRADE PRIOR TO PLACEMENT OF FILL OR CONSTRUCTION OF FOUNDATIONS.
4. STRUCTURAL FILL SHALL BE WELL-GRADED, DURABLE, GRANULAR SOIL CONFORMING TO THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT FINER BY WEIGHT
4"	100
1/4"	30-70
No 40	5-40
No 200	0-10

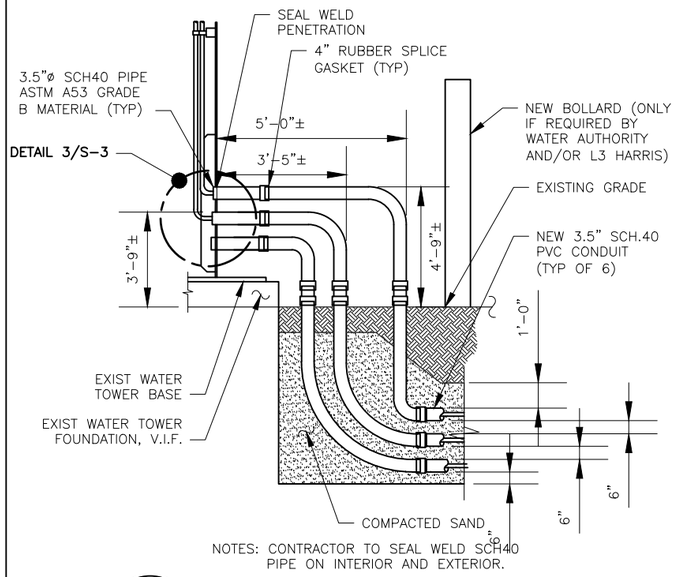
5. FILL AND BACKFILL SHALL BE PLACED IN MAXIMUM LOOSE LIFT THICKNESSES OF 8 INCHES IN OPEN AREAS, AND IN MAXIMUM LOOSE LIFT THICKNESS IN CONFINED AREAS. ALL FILL AND BACKFILL SHALL BE COMPACTED TO AT LEAST 95% OF MAXIMUM DRY DENSITY PER ASTM D1557 "LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT". HAND OPERATED COMPACTION EQUIPMENT SHALL BE UTILIZED WITHIN 4 FEET OF THE WALLS.
6. FREE DRAINING CRUSHED AGGREGATE SHALL CONFORM TO THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT FINER BY WEIGHT
1"	100
1/2"	30-100
1/4"	0-30
No 4	0-10
No 8	0-5

7. BOTTOM OF THE EXTERIOR FOOTINGS SHALL BE PLACED ON TOP OF EXISTING COMPETENT SOIL. NOTIFY ENGINEER IF ROCK IS ENCOUNTERED DURING CONSTRUCTION.
8. BOTTOM OF FOOTING ELEVATIONS ARE SUBJECT TO CHANGE AS FIELD CONDITIONS DICTATE AS DIRECTED BY A GEOTECHNICAL ENGINEER. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY AND ALL CHANGES AND OBTAIN A REVISED DESIGN OF THE FOUNDATION AND RETAINING WALLS AS REQUIRED.
9. PERFORM EXCAVATION, BACKFILLING, AND FILLING IN COMPLIANCE WITH SPECIFICATION 312000.
10. BLASTING IS PROHIBITED.

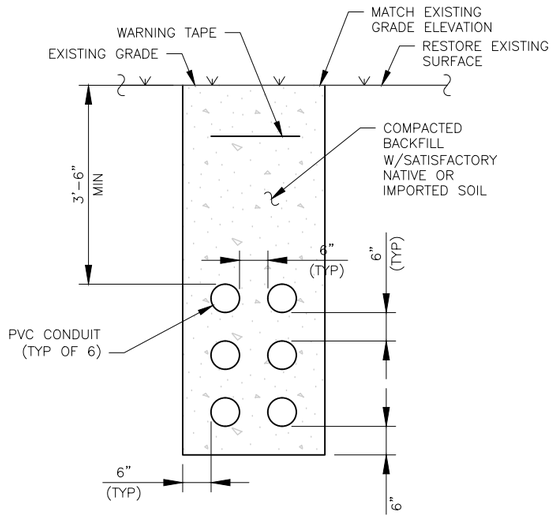
CODES

- INTERNATIONAL BUILDING CODE 2015
- MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES. ASCE/SEI 7-10 AMERICAN SOCIETY OF CIVIL ENGINEERS.
- STEEL CONSTRUCTION MANUAL LRFD/ASD 15TH EDITION, AMERICAN INSTITUTE OF STEEL CONSTRUCTION.



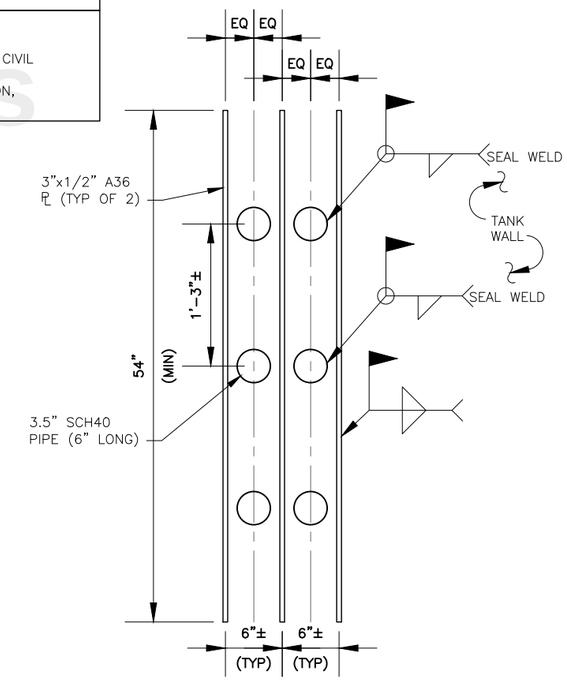
1 / S-3 CONDUIT PENETRATION DETAIL

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



2 / S-3 UNDERGROUND ANTENNA CABLE SECTION

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



3 / S-3 CABLE PORT REINFORCEMENT DETAIL (BOTTOM)

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

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE

749 W. STATE STREET,
MILWAUKEE, WI 53233

L3HARRIS™

1025 W. NASA BOULEVARD
MELBOURNE, FL 32919

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Project Contact Info
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
(800) 829-6531
www.tectonicengineering.com

PROJECT NUMBER	DESIGNED BY
12228.10 WFT	EI

REV	DATE	REVISION	DRAWN BY
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B	05/07/2024	PER CLIENT COMMENTS	SB
C	05/28/2024	PER CLIENT COMMENTS	SB
D	05/29/2024	PER CLIENT COMMENTS	SB

ISSUED BY | DATE

WISCONSIN
EDWARD N. IAMICELI
E-47180-6
NEWBURGH, NY
PROFESSIONAL ENGINEER

SITE INFORMATION

WFT

7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE

DESIGN CRITERIA, DETAILS & NOTES

SHEET NUMBER

S-3

SPECIAL INSPECTIONS – CONCRETE CONSTRUCTION					
VERIFICATION AND INSPECTION	REQUIRED	CONTINUOUS	PERIODIC	REFERENCE STANDARD	IBC 2015
INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	YES	–	X	ACI 318 Ch. 20, 25.2,25.3, 26.6.1–26.6.3	1908.4
REINFORCING BAR WELDING: A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706; B. INSPECT SINGLE–PASS FILLET WELDS, MAXIMUM 5/16" C. INSPECT ALL OTHER WELDS.	NO	– – – X	– X X –	AWS D1.4 ACI 318: 26.6.4	–
INSPECT ANCHORS CAST IN CONCRETE	YES	–	X	ACI 318: 17.8.2	–
INSPECT ANCHORS POST–INSTALLED IN HARDENED CONCRETE MEMBERS* A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN A	YES	X –	– X	ACI 318: 17.8.2.4 ACI 318: 17.8.2	–
VERIFY USE OF REQUIRED DESIGN MIX	YES	–	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	YES	X	–	ASTM C172 ASTM C31 ACI 318: 26.4, 26.12	1908.10
INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	YES	X	–	ACI 318: 26.5	1908.6, 1908.7, 1908.8
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	YES	–	X	ACI 318: 26.5.3–26.5.5	1908.9
INSPECT PRESTRESSED CONCRETE FOR: A. APPLICATION OF PRESTRESSING FORCES B. GROUTING OF BONDED PRESTRESSING TENDONS.	NO	X X	– –	ACI 318: 26.10	–
INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	NO	–	X	ACI 318: Ch. 26.8	–
VERIFY IN–SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST–TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	NO	–	X	ACI 318: 26.11.2	–
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	NO	–	X	ACI 318: 26.11.1.2(b)	–

TABLE 1705.6 REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS	CONTINUOUS SPECIAL	PERIODIC SPECIAL
VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADAQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	–	X
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	–	X
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	–	X
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	–
PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	–	X

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE
749 W. STATE STREET,
MILWAUKEE, WI 53233

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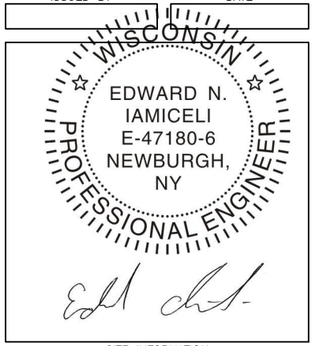


SITE INFORMATION
WFT
7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE
SPECIAL INSPECTION

SHEET NUMBER
S–4

MATERIAL LIST

ITEM	QTY	DBI#	VENDOR #	DESCRIPTION
1	1	6795	D-J/D00098	3'X7' 3P/LD/A/CTDC(RC) H/L ALUMINUM JOINER DOOR, HINGE LEFT, (3) S.S. HINGES, POLY INSULATION, 3 POINT LOCK, LORI DEADBOLT WITH ARROW CYLINDER, HASP FOR PAD LOCK AND REINFORCE FOR DOOR CLOSER, ALUMINUM DRIP CAP AND CARPET THRESHOLD AND ALARM BRACKET AND CHAIN CLIP
	1	2120	43461	3/16" GAL SHACKELS FOR 1/8" CHAIN
	3	2119	12497-00001	1/8 GALV CHAIN (PER FT)
	1	2121-F	CUSTOM	FIBERGLASS DOOR SHIELD 24"D X 48"W STONE FLAKE, SHIP LOOSE
2	1	3693	AOL APC7R	ALL PRO COMBO EMERGENCY LIGHT W/ RED EXIT SIDE MOUNT- LED
3	2	8778	LBL4 LP840	LITHONIA LBL4 LP840 4' LED WRAPAROUND VOLT 4,000 LUMENS
⚠4	2	7717	CS120W	SINGLE WALL SWITCH WHITE 20A, 120/277V- CS120W
5	3	7482	CR20WHI	WHITE DUPLEX RECEPTACLE NEMA 5-20R (10 MOUNTED TO CEILING)
6	1	9935	HUB GFTWRST20W	COMMERCIAL TAMPER-RESISTANT & WEATHER RESISTANT GFCI RECEPTACLE 20A SELF TEST WHITE
	1	10429	RAC MX3200	RAC MX3200 1G, WP, VERT, 8IN1 WIU COVER 3-1/2 DEEP GRAY
	1	5341	RAC 5386-0	1G WP DEEP BOX (3) 3/4" OUTLETS-GRAY 3/4" KO
7	1	9998	WP2LED34L-750U OLTM2	RAB WALPAK 23WATT LED 5000K, 3,341 LUMENS, SURFACE MNT BX. DARK BRONZE FINISH
	1	3720	PMC T-15	PHOTO CONTROL MODEL T-15, PMC T-15 SPST 120V PHOTOCELL
8	2	–	W24AY-A05XP5XXJ	BARD 2 TON HVAC, 1PH, 5KW HEAT, DESERT BROWN, 11 EER
	2	1960	85505 / I20061	SUPPLY GRILL, 20X8 BARD
	2	1959	85525 / I20002	RETURN GRILL, 20X12 BARD
9	1	7474	MC4001-A	BARD THERMOSTAT CONTROLLER MC4001-A
10	1	4074	SQD D224NRB	GENERAL DUTY SAFETY SWITCH, FUSIBLE, 200 AMP, 120/240 VAC 1PH, 2 POLES, NEMA 3R, NEUTRAL FACTORY INSTALLED NEUTRAL
	1	5332	SQD SN20A	NEUTRAL ASSEMBLY, INSULATED, GROUNDABLE AL/CU
	2	4029	BUS NON-200	BUSS NON-200 BUSS ONE TIME FUSE
11	1	3835	SQD QO140M200P	LOAD CENTER, QO, 1-PHASE, 40 CIRCUITS, 200 AMP CONVERTIBLE MAIN BREAKER, NEMA 1, UL
	1	3840	SQD QOC40US	COVER, QO, LOAD CENTER, 40 CIRCUITS, SURFACE, GRAY
	3	7774	PK23GTA	GROUND BAR KIT FOR ELEC DIST PANEL 23 POSITION PK23GTA
	4	3921	QO120	BREAKER SP 20 AMP 120/240VAC
	2	3924	QO140	BREAKER SP 40 AMP 120/240VAC
	4	3927	QO220	BREAKER 2P 20 AMP 120/240VAC
	2	3930	QO235	BREAKER 2P 35 AMP 120/240VAC
	4	3931	QO240	BREAKER 2P 40 AMP 120/240VAC
12	1	1553	CX109-576/B576	CABLE ENTRY PORT (8-4" PORTS 2X4)
13	1	4164	SB-17-12YZ	GOLD CHROMATE TRAY 12"X10'
	–	4454	W731312	5/8" ALL THREAD (GOLD PLATED), PER 12 FOOT JOINT
	4	4175	CTH-6010	CEILING HANGER BRACKETS WITH TWO GOLD NUTS
	4	4177	CTH-6043	SLOTTED HANGER KIT NO HARDWARE
	1	4190	CTH-6060	J-BOLTS 2-3/4-5/16 IN
	1	5440	–	WALL ANGLE 15" LONG TO ATTACH TRAY TO WALL
	1	4195	CTH-6023	LADDER RACK END CAPS (COMES IN PACK OF 10)
14	2	1438	DB205T-KIT	1/4"X4"X20" TINNED COATED BUS BAR WITH ISOLATORS, BRACKETS, HARDWARE, AND LAGS
15	–	–	–	HALO GROUND RING INSTALLED IN SHELTER- #2 GREEN HALO, #6 GREEN DROPS TO EQUIPMENT, & 20' #2 SOLID TINNED DROPS TO EXTERIOR
16	1	6017	–	3/4" GROUNDING EXIT AT 45' THROUGH WALL
17	1	8214	UNT 664SCNK	6X6X4 N1 SCREW COVER PULL BOX NO K.O. POWDER COATED
	2	–	–	8' #8 WIRE COILED ON TRAY, CUT TO LENGTH & TERMINATE FIELD BY CUSTOMER

NOTE: 1. WIRE THE SWITCH PER HALF THE LIGHTS.

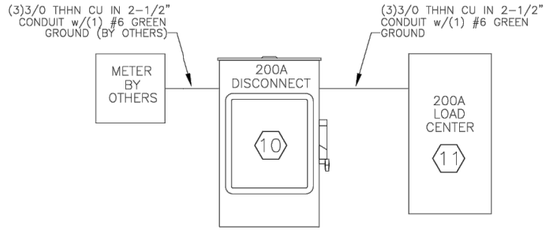
SHIP LOOSE LIST

1. (6) 1/8" SHIM PLATES
2. (6) 1/4" SHIM PLATES
3. (1) 24" X 48" STONE FLAKE SHIELD
4. (4) HOLD DOWN PLATES

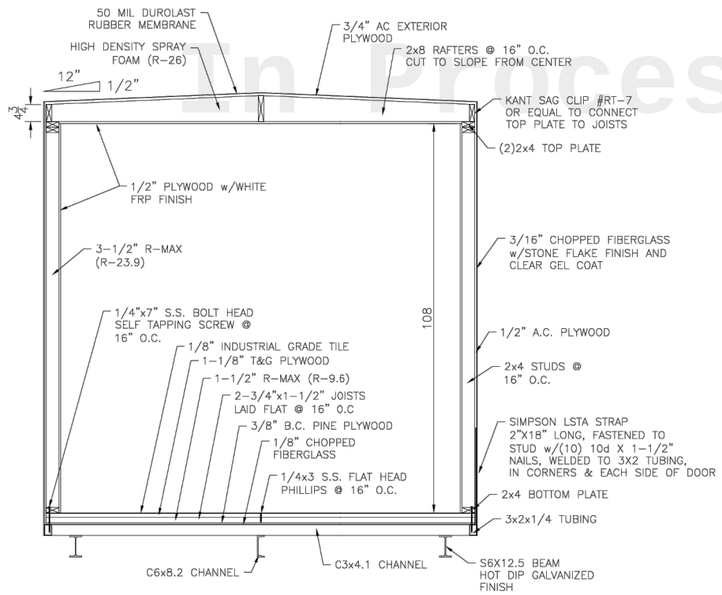
SCHEDULE-PANEL

PANEL 120/240V 1 PHASE 200 AMP. MAIN BREAKER

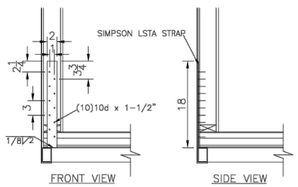
DESCRIPTION	CB	#	LOAD	#	CB	DESCRIPTION
LIGHTS	20/1	1	197 / 3705	2	15/1	HVAC #1
HVAC #2	35/3	3	3233 / 3705	4	3	
		5	3220 / 540	6	20/1	INTERIOR RECEPTACLES
SPARE	20/1	7	– / 180	8	20/1	EXTERIOR RECEPTACLE
SPARE	20/1	9	– / –	10	20/1	SPARE
		11	– / –	12	3	
SPARE	20/1	13	– / –	14	20/1	SPARE
		15	– / –	16	3	
SPARE	40/2	17	– / –	18	40/2	SPARE
		19	– / –	20	3	
SPARE	40/2	21	– / –	22	40/2	SPARE
		23	– / –	24	3	
SPARE	20/1	25	– / –	26		
SPARE	20/1	27	– / –	28		
		29	– / –	30		
		31	– / –	32		
		33	– / –	34		
		35	– / –	36		
		37	– / –	38		
		39	– / –	40		
PHASE LOAD			8087 / 7820			
TOTAL LOAD	8087w / 120v = 67.4 AMPS					



WIRING DIAGRAM



CONSTRUCTION DETAIL



NOTE: STRAP ON EACH CORNER, EACH SIDE OF DOOR

STRAP DETAILS
SCALE: 1"=1'-0"

APPLICABLE CODES:

IBC – 2015 EDITION
NEC – 2014 EDITION
IMC – 2015 EDITION
IECC – 2015 EDITION

MAXIMUM FLOOR LIVE LOAD: 150 PSF
MAXIMUM ROOF LIVE LOAD: 30 PSF
DESIGN/RISK CATEGORY II
MAXIMUM WIND LOAD: 100 MPH – EXP. C
OCCUPANCY/ USE GROUP TYPE: S-2
CONSTRUCTION TYPE: V-B
MINIMUM BUILDING SETBACK REQUIREMENTS: 15'
SEISMIC ZONE: Sds = 0.108, Sd1= 0.088, SITE CLASS = D, DESIGN CAT. = B

THIS BUILDING IS NOT FOR HUMAN OCCUPANCY

1 / S-5 SHELTER ROOM SPECIFICATIONS

SCALE: NTS

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

DUPONT BUILDING, INC.
100 RITA DRIVE
BELL CITY, LA. 70630
337 / 905-5928
FAX:337 / 905-5268

CUSTOMER: CUSTOM TOWER
MILWAULKEE SHELTER

SIZE: 10' X 10' X 9'

SHEET TITLE: MATERIAL LIST

REV	DATE	DESCRIPTION
1	01/04/2024	REVISED PER CUSTOMER MARK UP DRAWING
2	01/08/2024	REVISED GROUND WIRE

SERIAL NO.: -
DRAWING NO.: 23137
DRAWN: K. SAVOIE
RELEASE DATE: 12/18/2023
CHECKED BY: / DATE/ REV

SHEET NO.: 1 OF 5

MILWAUKEE POLICE

749 W. STATE STREET,
MILWAUKEE, WI 53233

L3HARRIS™

1025 W. NASA BOULEVARD
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ISSUED BY:
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WISCONSIN PROFESSIONAL ENGINEER
EDWARD N. IAMICELI
E-47180-6
NEWBURGH, NY

SITE INFORMATION

WFT

7402 W PUETZ RD
FRANKLIN,WI 53132, USA

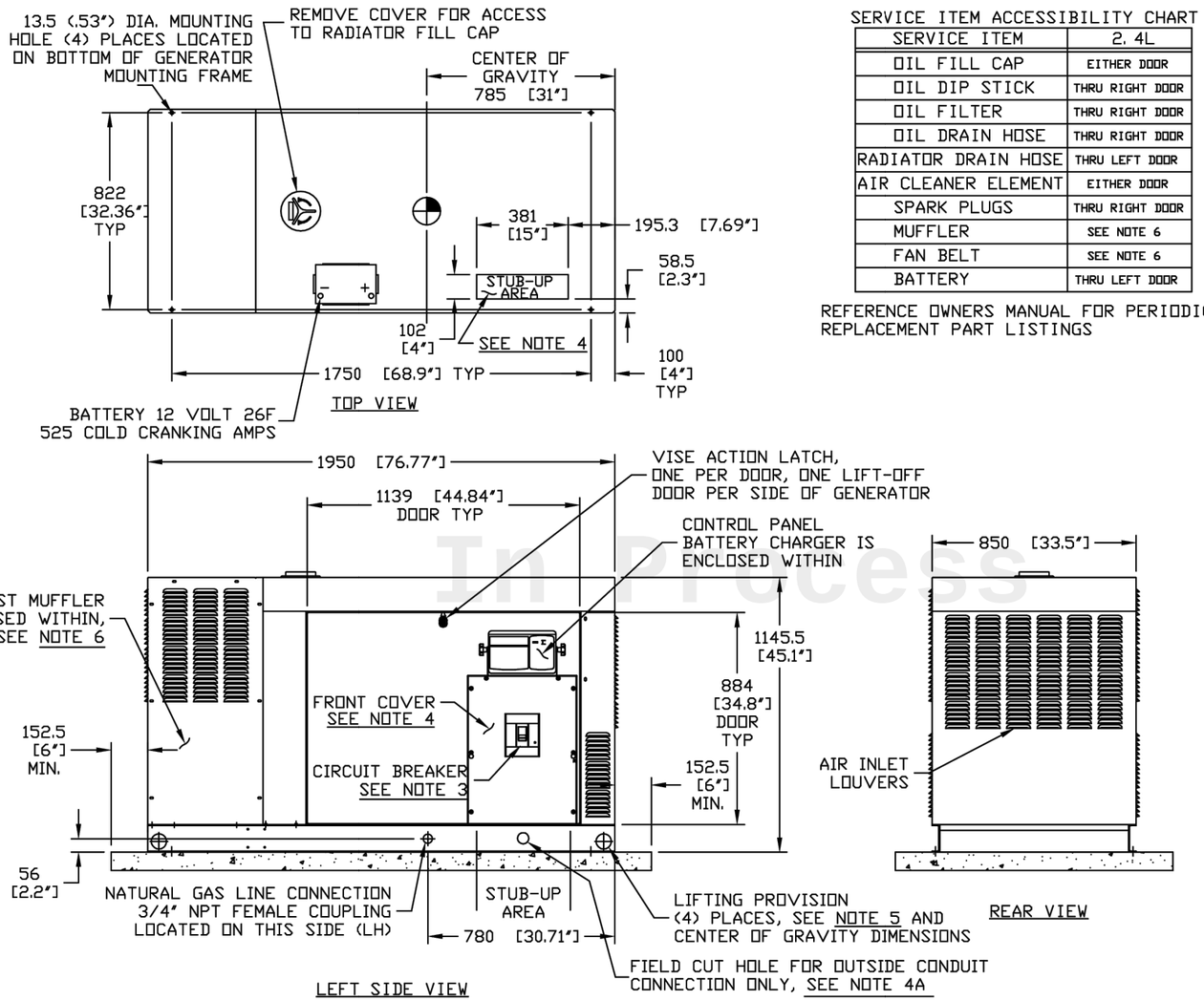
SHEET TITLE

SHELTER ROOM SPECIFICATIONS

SHEET NUMBER

S-5

GROUP G



SERVICE ITEM ACCESSIBILITY CHART

SERVICE ITEM	2, 4L
OIL FILL CAP	EITHER DOOR
OIL DIP STICK	THRU RIGHT DOOR
OIL FILTER	THRU RIGHT DOOR
OIL DRAIN HOSE	THRU RIGHT DOOR
RADIATOR DRAIN HOSE	THRU LEFT DOOR
AIR CLEANER ELEMENT	EITHER DOOR
SPARK PLUGS	THRU RIGHT DOOR
MUFFLER	SEE NOTE 6
FAN BELT	SEE NOTE 6
BATTERY	THRU LEFT DOOR

REFERENCE OWNERS MANUAL FOR PERIODIC REPLACEMENT PART LISTINGS

REVISION: H-6297-F
DATE: 3/31/10

EXPLODED VIEW:
INSTLTN DRAWING 2.4L 25 KW, 35KW & 45KW
DRAWING #: 0G0325

1 / S-6 GENERATOR SPECIFICATIONS
SCALE: NTS

PLANS ARE NOT TO BE SCALED
0 1 2 3
ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE
749 W. STATE STREET,
MILWAUKEE, WI 53233

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PROFESSIONAL ENGINEER

SITE INFORMATION
WFT
7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE
GENERATOR SPECIFICATIONS

SHEET NUMBER
S-6

ELECTRICAL INSTALLATION NOTES

A. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE APPROPRIATE JURISDICTION CODES.

B. CONDUIT ROUTINGS ARE SCHEMATIC. GENERAL CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

C. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND CODES AND STANDARDS LISTED ON PAGE T2.

D. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND CODES AND STANDARDS LISTED ON PAGE T2.

E. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA.

F. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).

G. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.

H. ALL WIRING SHALL BE ACCESSIBLE FOR MAINTENANCE AND SHALL BE RUN NEATLY, WITHOUT SPLICES & WITH ADEQUATE LACING OR CLAMPING. TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES. EXTRA WIRING NECESSARY FOR EQUIPMENT MOVEMENT SHALL BE NEATLY COILED, FASTENED, AND CONCEALED.

I. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#12 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

J. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#12 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

K. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).

L. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

M. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX OR EQUAL) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

N. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

O. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.

P. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 4X (OR BETTER) OUTDOORS.

Q. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 4X (OR BETTER) OUTDOORS.

R. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 4X (OR BETTER) OUTDOORS.

S. THE GENERAL CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONSTRUCTION MANAGER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

T. GENERAL CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY BEFORE THE START OF CONSTRUCTION. POWER CONDUIT SHALL BE PROVIDED AND INSTALLED PER UTILITY REQUIREMENTS.

U. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT REFER TO DRAWINGS PROVIDED BY AC OR TELCO PANEL MANUFACTURER.

V. ALL SERVICE EQUIPMENT AND INSTALLATIONS SHALL COMPLY WITH THE N.E.C. AND UTILITY COMPANY AND APPROPRIATE JURISDICTION CODE REQUIREMENTS.

W. GENERAL CONTRACTOR SHALL PROVIDE ELECTRICAL SERVICE EQUIPMENT WITH FAULT CURRENT RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT FROM THE POWER UTILITY.

X. GENERAL CONTRACTOR SHALL VERIFY THAT THE MAIN BONDING JUMPER AND GROUNDING ELECTRODE CONDUCTOR IS INSTALLED PROPERLY IN MAIN DISCONNECT SWITCH.

Y. CABLE AND WIRING PENETRATIONS THROUGH METAL CABINETS SHALL BE INSULATED WITH DIELECTRIC GROMMETS.

Z. ALL CABLE PENETRATIONS INTO ALL BOXES OR WALLS INCLUDING THE CABINET, ATS, J-BOX, OR OTHER ELECTRICAL BOXES SHALL BE MADE WATER TIGHT AND NOT REQUIRE REWORK THROUGH THE WARRANTY PERIOD.

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE

749 W. STATE STREET,
MILWAUKEE, WI 53233

L3HARRIS™

1025 W. NASA BOULEVARD
MELBOURNE, FL 32919

Tectonic
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Tectonic Engineering & Surveying Consultants P.C.
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PROJECT NUMBER	DESIGNED BY
12228.10 WFT	EI

REV	DATE	REVISION	DRAWN BY
A	04/25/2024	ISSUED FOR COMMENT	VM
B	05/07/2024	PER CLIENT COMMENTS	SB
C	05/28/2024	PER CLIENT COMMENTS	SB
D	05/29/2024	PER CLIENT COMMENTS	SB

ISSUED BY	DATE

WISCONSIN
EDWARD N. IAMICELI
E-47180-6
NEWBURGH, NY
PROFESSIONAL ENGINEER

SITE INFORMATION

WFT

7402 W PUETZ RD
FRANKLIN,WI 53132, USA

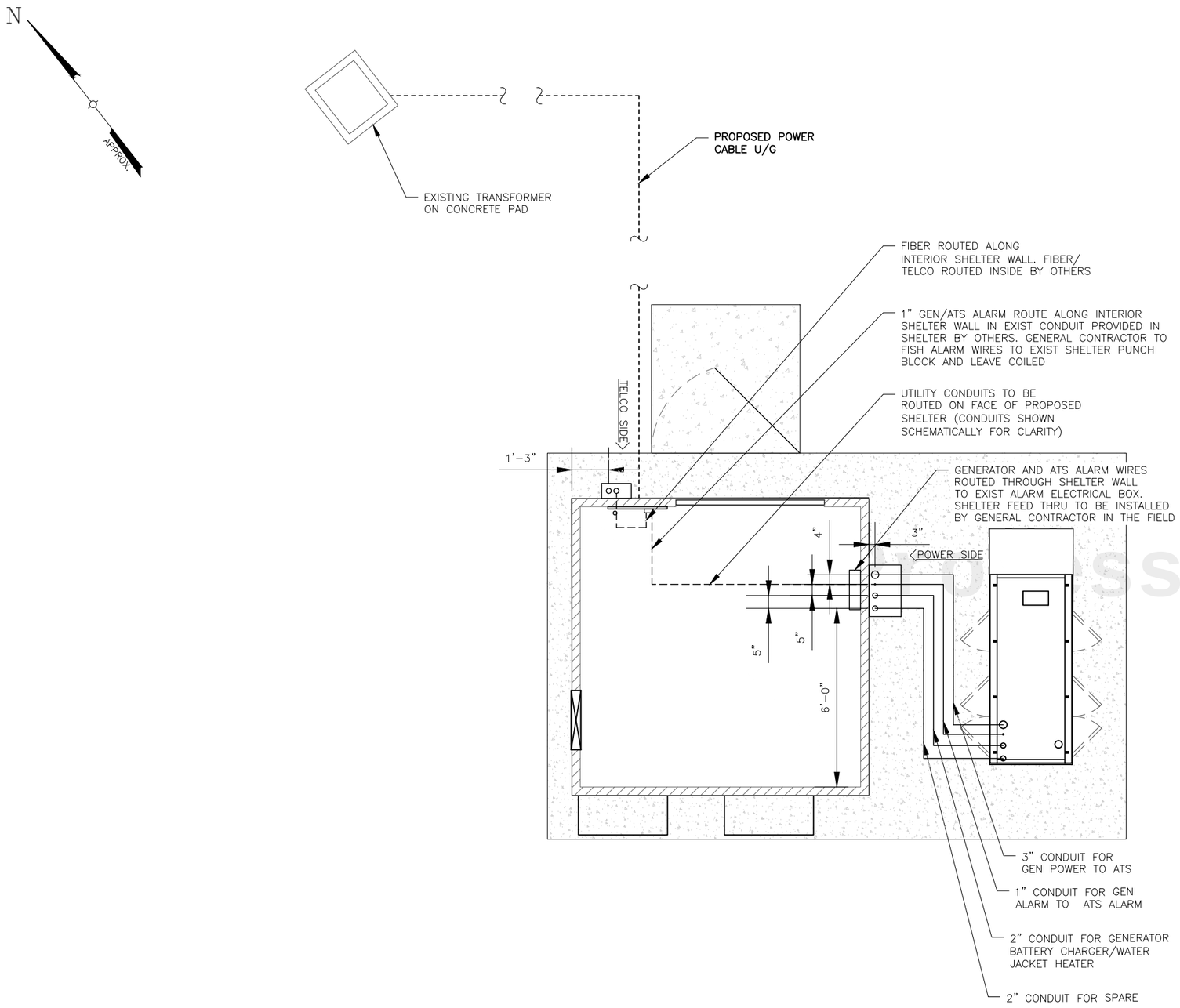
SHEET TITLE

ELECTRICAL ONE-LINE DIAGRAM, & NOTES

NOTES

SHEET NUMBER

E-1



NOTE: PER THE CLIENT'S REQUEST THE CONDUITS FROM THE GENERATOR TO THE SHELTER ARE ROUTED OVER THE GROUND.

1 / E-2 CONDUIT PLAN

SCALE: NTS

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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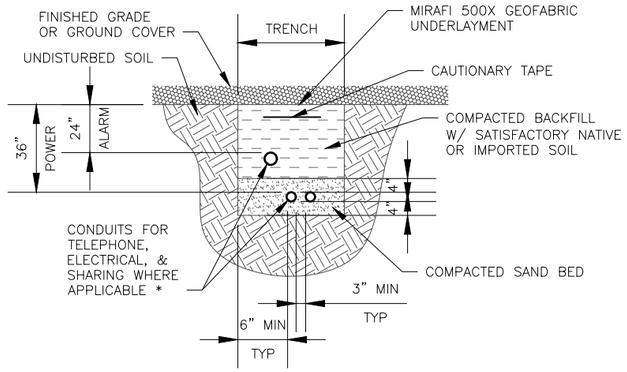
SHEET TITLE

ELECTRICAL PLAN
& ELEVATION DETAIL

SHEET NUMBER

E-2



* CONDUIT SIZE, TYPE, QUANTITY AND SEPARATION DIMENSION TO BE VERIFIED WITH LOCAL UTILITY COMPANY REQUIREMENTS

NOTE:
IF MIN. DEPTH CAN NOT BE REACH INSTALL 2" CONCRETE STRIP AT A MIN. DEPTH OF 4" BELOW GRADE.

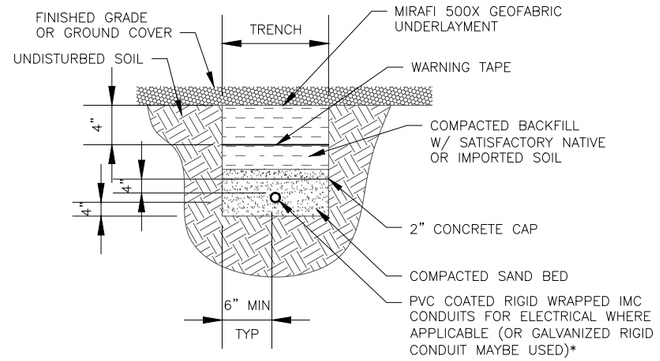
1 / E-3 DIRECT BURIED CONDUIT

SCALE: NTS

ALL SHELTER PENETRATIONS TO BE INSTALLED WITH WATER TIGHT SEALS AND DONE IN FIELD.

PROPOSED NON-METALLIC FLEXIBLE CONDUIT WITH "S-LOOP" (FOR GROUND ONLY)

CAP ALL CONDUIT 6" ABOVE CONCRETE FINISH AND PREP CONDUIT TO BE WATER TIGHT. PROVIDE 12" EXCESS NYLON PULL STRING IN ALL CONDUIT PRIOR TO INSTALLATION OF EQUIPMENT.

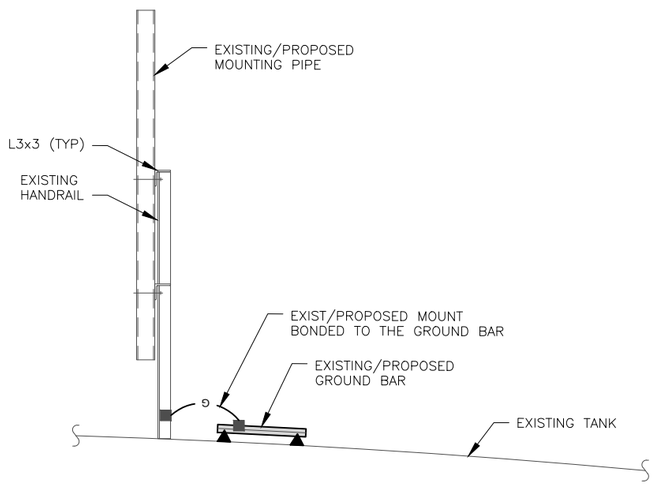


* CONDUIT SIZE, TYPE, QUANTITY AND SEPARATION DIMENSION TO BE VERIFIED WITH LOCAL UTILITY COMPANY REQUIREMENTS

NOTE:
UTILIZE DUCT BANK DETAIL WHERE CONDUIT DEPTHS CAN NOT BE REACHED. MIN. COVERAGE 12" PER NEC TABLE 300.5. IF THIS 12" CAN NOT BE MET, CONTACT ENGINEER.

2 / E-3 DUCT BANK

SCALE: NTS



3 / E-3 ANTENNA MOUNT GROUNDING PLAN

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

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE

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SITE INFORMATION

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FRANKLIN,WI 53132, USA

SHEET TITLE

ELECTRICAL DETAILS & ELEVATIONS

SHEET NUMBER

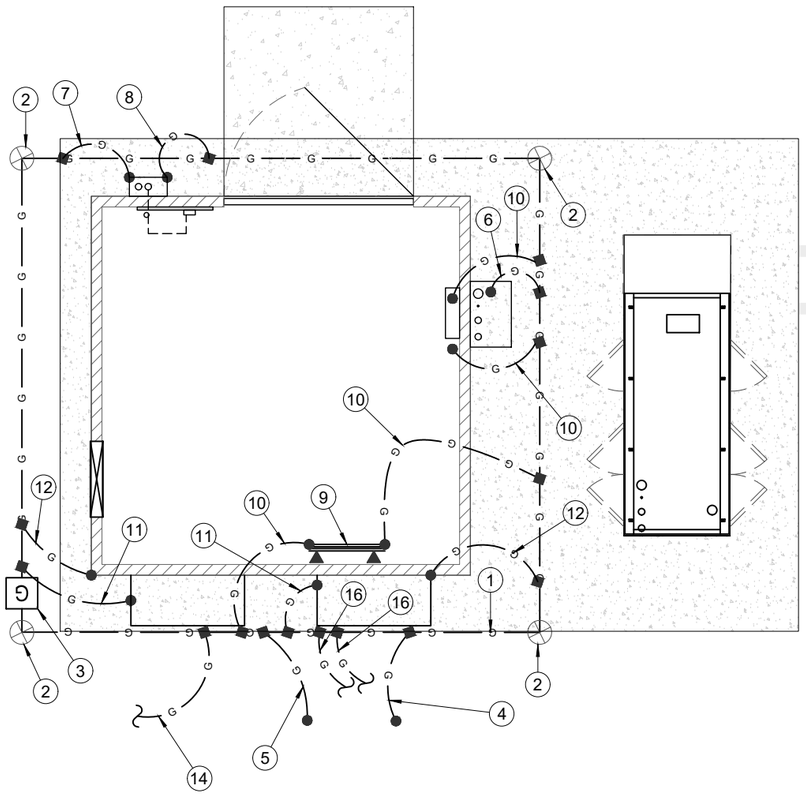
E-3

GROUNDING LEGEND

- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- BUSS BAR INSULATOR
- #6 AWG STRANDED & INSULATED
- GROUND ROD/WELL

N

APPROX.



NOTE: GROUND TO CONTROL PANEL SHOULD ENTER THROUGH STUB–UP, VERIFY LOCATION

1 / G–1 GROUNDING PLAN

SCALE: 3/8" = 1'–0"

GROUNDING SPECFICATIONS

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

B. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.

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

D. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK–TO–BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.

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

F. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.

G. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TIN–PLATED COPPER UNLESS OTHERWISE INDICATED.

H. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE EXTERIOR UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS.

I. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE GENERAL CONTRACTORS STRUCTURAL ENGINEER.

J. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO HOLED MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.

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

L. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.

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

N. BOND ALL METALLIC OBJECTS WITHIN 10 FT OF THE BURIED GROUND RING WITH # 2 SOLID AWG TIN–PLATED COPPER GROUND CONDUCTOR.

O. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR APPROPRIATE JURISDICTION CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., STEEL CONDUIT PROHIBITED BY APPROPRIATE JURISDICTION CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.

P. AVOID MECHANICAL CONNECTIONS WHENEVER POSSIBLE. EXOTHERMICALLY WELD WHENEVER POSSIBLE

Q. WHEN USING ANY CRIMP LUGS THE CRIMP DIE AND LUG MANUFACTURER MUST MATCH

R. TWO (2) HOLE LONG BARREL LUGS SHALL BE USED WITH DOUBLE CRIMPS AND TWO BOLTS/NUTS/SETS OF WASHERS

S. INSPECTION WINDOWS SHALL BE PROVIDED IN LUGS

T. NON–OXIDATION COMPOUNDS SHALL BE USED WITHIN THE BARREL OF THE LUG

U. NO MORE THAN 1/8 INCH OF EXPOSED COPPER FROM THE END OF THE LUG TO THE INSULATION IS ALLOWED.

V. CLEAR HEAT SHRINK SLEEVING SHALL BE INSTALLED OVER THE LENGTH OF THE LUG AND 1 TO 2 INCHES UP THE INSULATED WIRE

W. ALL GROUND LEADS INSTALLED BELOW GRADE SHALL BE ROUTED THROUGH 3/4" FLEXIBLE CONDUIT AND SEALED WITH CAULKING.

X. GENERAL CONTRACTOR SHALL PERFORM A GROUND VERIFICATION TEST. RESISTIVITY TO THE GROUND RING, GROUND POINTS WITH THE GROUND GRID AND EVERY POINT ALONG THE GROUND PATH SHALL BE TESTED AND RESULTS RECORDED.

KEY NOTES

1. EXTERNAL GROUND RING: #2 AWG BARE TINNED SOLID COPPER GROUND RING BURIED TO FROST LINE (30" MIN.) BELOW GRADE (TYP.) ALL GROUND LEADS SHALL BE CONNECTED TO EXTERNAL GROUND RING WITH EXOTHERMIC WELD CONNECTION & #2 AWG BARE TINNED SOLID COPPER (UNLESS OTHERWISE NOTED). ROUTE ALL GROUND LEADS IN 3/4" NONMETALLIC FLEX CONDUIT & CAULKED WATERTIGHT (TYP. ALL LEADS PORTIONS BELOW GRADE).
2. PROPOSED GROUND ROD (TYP.)
3. PROPOSED INSPECTION WELL (TYP.)
4. GROUND PROPOSED GENERATOR PER MANUFACTURERS RECOMMENDATIONS (GROUND TO GENERATOR MGB OR TO TANK BELLY THEN MGB)
5. GROUND GENERATOR FUEL TANK FRAME WITH 2–HOLE LUG MECHANICAL CONNECTION.
6. GROUND PROPOSED AUTOMATIC TRANSFER SWITCH CHASSIS PER MANUFACTURERS RECOMMENDATIONS.
7. GROUND SERVICE GROUND W/ #2 AWG SOLID BARE TINNED COPPER WIRE TO CLOSEST GROUND ROD. COORDINATE GROUNDING REQUIREMENTS WITH LOCAL UTILITY COMPANY.
8. GROUND PROPOSED TELCO BOX AND METER/DISCONNECT PER MANUFACTURER'S RECOMMENDATIONS.
9. 10' #2 GROUND LEAD COIL FOR INTERIOR MAIN GROUND BAR (MGB, GROUND BAR CONNECTION & COIL PROVIDED BY SHELTER MANUFACTURER). GENERAL CONTRACTOR TO PROVIDE EXOTHERMIC WELD CONNECTION TO EXTERNAL GROUND RING, 2 PLACES.
10. 10' #2 GROUND LEAD COIL FOR EXTERNAL GROUND BAR (EGB, GROUND BAR CONNECTION & COIL PROVIDED BY SHELTER MANUFACTURER). GENERAL CONTRACTOR TO PROVIDE EXOTHERMIC WELD CONNECTION TO EXTERNAL GROUND RING, 2 PLACES.
11. PROVIDE 60" #2 GROUND LEAD COIL TO GROUND PROPOSED HVAC UNITS (TYP. OF 2 UNITS PROVIDED WITH SHELTER) TO GROUND RING PER MANUFACTURER'S RECOMMENDATIONS.
12. 10' #2 GROUND LEAD COIL TO GROUND PROPOSED SHELTER ANCHOR PLATE (ANCHOR PLATE CONNECTION & COIL PROVIDED BY SHELTER MANUFACTURER) TO GROUND RING. GENERAL CONTRACTOR TO PROVIDE EXOTHERMIC WELD CONNECTION TO EXTERNAL GROUND RING, 2 PLACES.
13. GROUND PROPOSED GROUND RING TO EXISTING / NEW FENCE POST AT CLOSEST POSSIBLE LOCATION.
14. CONNECT PROPOSED GROUND RING TO EXISTING GROUND RING WITH EXOTHERMIC CONNECTION (TYP. OF 2)
15. PROPOSED TOWER MOUNTED GROUND BAR. BOND TOWER MOUNTED GROUND BAR W/ EXOTHERMIC WELD CONNECTION TO EXISTING TOWER GROUNDING RING W/ #2 AWG BARE TINNED SOLID COPPER CONDUCTOR IN NON–METALLIC CONDUIT. PROVIDE SEALANT FOR WATERTIGHT CONDITION. PROVIDE A EXCESS COIL LEAD OF 10' MIN. PRIOR FOR INSTALLATION OF TOWER GROUND BAR (TYP. OF 2 LEADS). IF TOWER BUSHBAR DOES NOT EXSIT, GC TO INSTALL BUS BAR.
16. GROUND EACH ICE–BRIDGE POST TO CLOSEST GROUND RING. BOND EACH ICE–BRIDGE SECTION TOGETHER WITH JUMPERS, THEN BOND FIRST AND LAST SECTION TO CLOSEST GROUND RING. RF CABLES PROVIDED AND INSTALLED BY OTHERS. COAX TO BE GROUNDED TO PROPOSED EXTERIOR GROUND BAR INSTALLED AT SHELTER & TOWER.

GROUNDROD NOTES

1. LOCATION OF GROUND RODS SHOWN ON THIS DRAWING ARE SCHEMATIC IN NATURE. GENERAL CONTRACTOR SHALL FIELD DETERMINE PLACEMENT. ALL GROUND RODS SHALL HAVE A MINIMUM SEPARATION OF 8'–0" AND MAXIMUM SEPARATION OF 16'–0".
2. IF SOIL IS SHALLOW AND ROCK BASE PREVENTS DEEP DRIVING GROUND RODS. GENERAL CONTRACTOR SHOULD CONTACT HARRIS GROUNDING TEAM FOR APPROVED ALTERNATE.

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

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PROFESSIONAL ENGINEER

SITE INFORMATION

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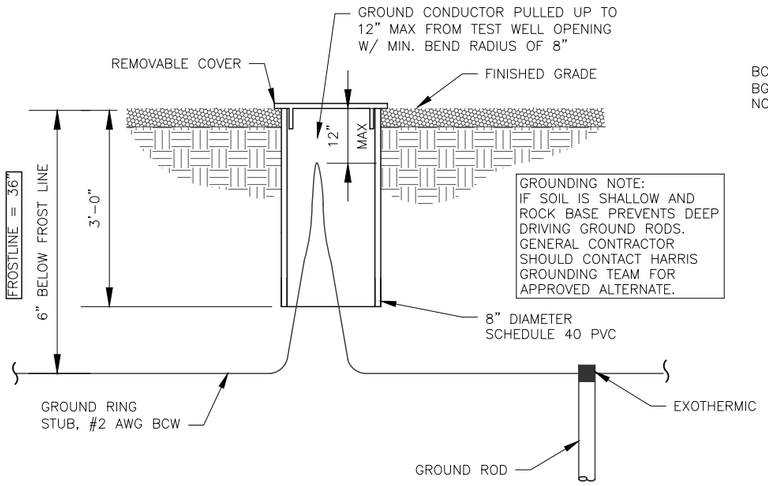
7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE

GEN & SHELTER GROUNDING PLAN & DETAILS

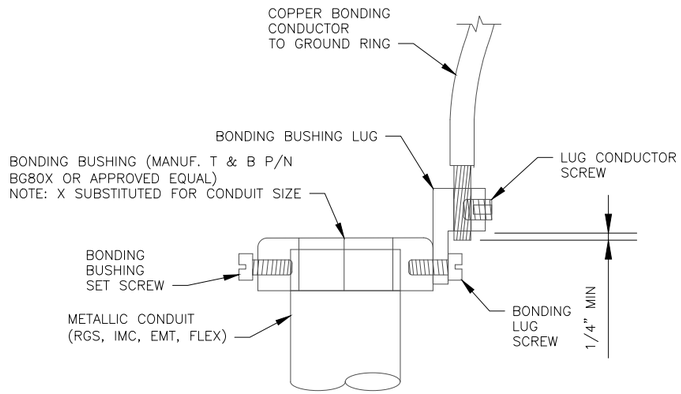
SHEET NUMBER

G–1



1 / G-2 INSPECTION WELL DETAIL

SCALE: NTS



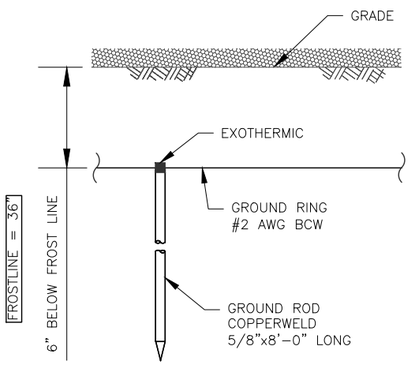
DIRECTIONS:
1. MOUNT BONDING BUSHING ONTO CONDUIT
2. TIGHTEN BOND BUSHING SET SCREW
3. INSERT COPPER CONDUCTOR INTO LUG
4. TIGHTEN LUG CONDUCTOR SCREW
5. TIGHTEN BONDING LUG SCREW

NOTE: BONDING BUSHING, SET SCREW, LUG, LUG SCREW, COND. LUG SCREW, SHOWN AS COMPLETE UNIT.

GROUNDING NOTE: DO NOT USE METALLIC CONDUIT FOR SERVICE GROUND OR ANY OTHER GROUNDING CONDUIT.

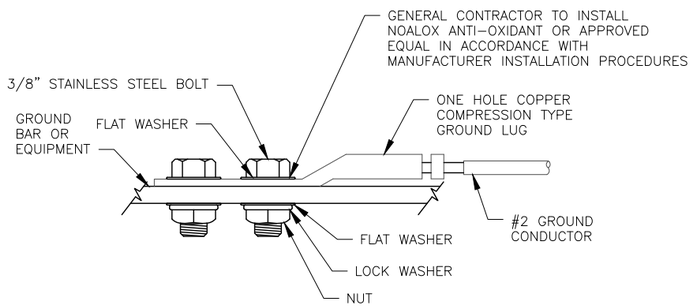
2 / G-2 METALLIC CONDUIT DETAIL

SCALE: NTS



3 / G-2 GROUND ROD DETAIL

SCALE: NTS



4 / G-2 MECHANICAL GROUND CONNECTION

SCALE: NTS

GROUNDING SPECFICATIONS

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

B. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.

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

D. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.

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

F. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.

G. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.

H. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE EXTERIOR UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS.

I. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE GENERAL CONTRACTORS STRUCTURAL ENGINEER.

J. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO HOLED MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.

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

L. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.

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

N. BOND ALL METALLIC OBJECTS WITHIN 10 FT OF THE BURIED GROUND RING WITH # 2 SOLID AWG TIN-PLATED COPPER GROUND CONDUCTOR.

O. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR APPROPRIATE JURISDICTION CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., STEEL CONDUIT PROHIBITED BY APPROPRIATE JURISDICTION CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.

P. AVOID MECHANICAL CONNECTIONS WHENEVER POSSIBLE. EXOTHERMICALLY WELD WHENEVER POSSIBLE

Q. WHEN USING ANY CRIMP LUGS THE CRIMP DIE AND LUG MANUFACTURER MUST MATCH

R. TWO (2) HOLE LONG BARREL LUGS SHALL BE USED WITH DOUBLE CRIMPS AND TWO BOLTS/NUTS/SETS OF WASHERS

S. INSPECTION WINDOWS SHALL BE PROVIDED IN LUGS

T. NON-OXIDATION COMPOUNDS SHALL BE USED WITHIN THE BARREL OF THE LUG

U. NO MORE THAN 1/8 INCH OF EXPOSED COPPER FROM THE END OF THE LUG TO THE INSULATION IS ALLOWED.

V. CLEAR HEAT SHRINK SLEEVING SHALL BE INSTALLED OVER THE LENGTH OF THE LUG AND 1 TO 2 INCHES UP THE INSULATED WIRE

W. ALL GROUND LEADS INSTALLED BELOW GRADE SHALL BE ROUTED THROUGH 3/4" FLEXIBLE CONDUIT AND SEALED WITH CAULKING.

X. GENERAL CONTRACTOR SHALL PERFORM A GROUND VERIFICATION TEST. RESISTIVITY TO THE GROUND RING, GROUND POINTS WITH THE GROUND GRID AND EVERY POINT ALONG THE GROUND PATH SHALL BE TESTED AND RESULTS RECORDED.

PLANS ARE NOT TO BE SCALED

0 1 2 3

ORIGINAL SIZE IN INCHES

MILWAUKEE POLICE
749 W. STATE STREET,
MILWAUKEE, WI 53233

L3HARRIS™
1025 W. NASA BOULEVARD
MELBOURNE, FL 32919

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PROJECT NUMBER	DESIGNED BY
12228.10 WFT	EI

REV	DATE	REVISION	DRAWN BY
A	04/25/2024	ISSUED FOR COMMENT	VM
B	05/07/2024	PER CLIENT COMMENTS	SB
C	05/28/2024	PER CLIENT COMMENTS	SB
D	05/29/2024	PER CLIENT COMMENTS	SB

ISSUED BY | DATE

WISCONSIN
EDWARD N. IAMICELI
E-47180-6
NEWBURGH, NY
PROFESSIONAL ENGINEER

SITE INFORMATION

WFT

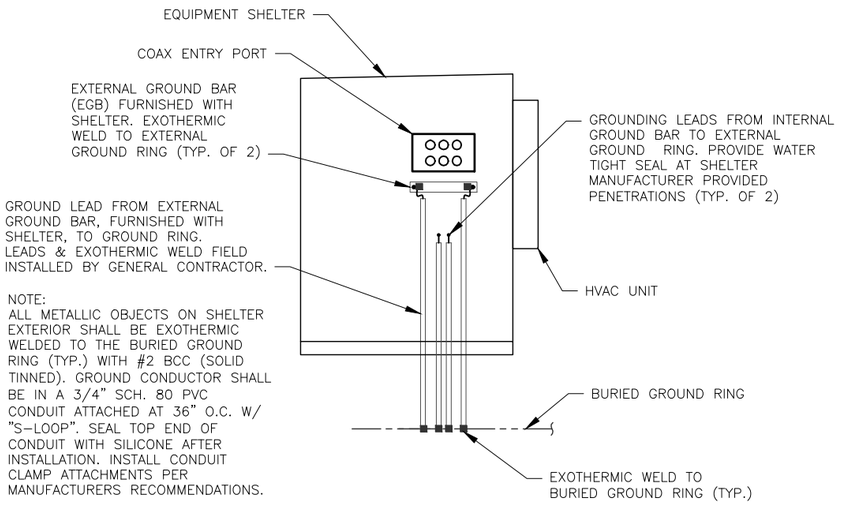
7402 W PUETZ RD
FRANKLIN,WI 53132, USA

SHEET TITLE

GROUNDING DETAILS & NOTES

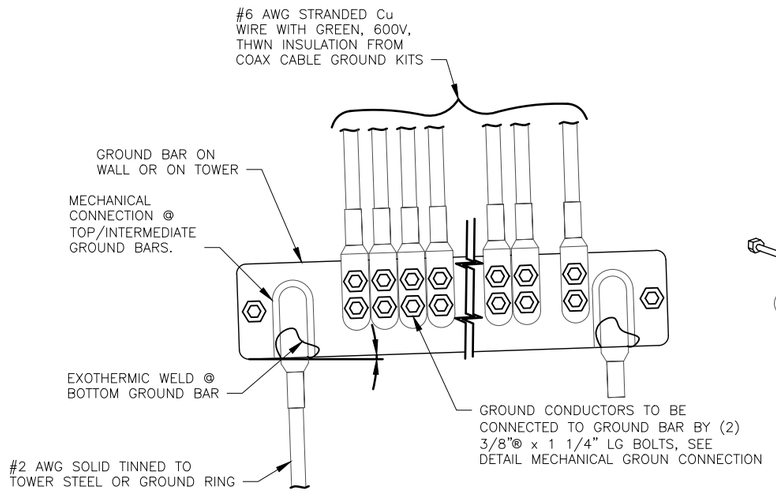
SHEET NUMBER

G-2



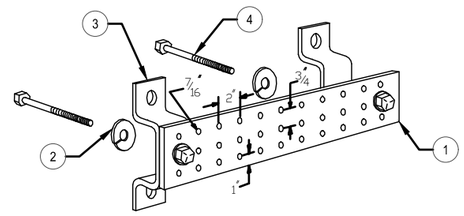
1 G-3 SHELTER GROUND BAR DETAIL

SCALE: NTS



2 G-3 INSTALLATION OF GROUND WIRE TO COAX CABLE GROUND BAR

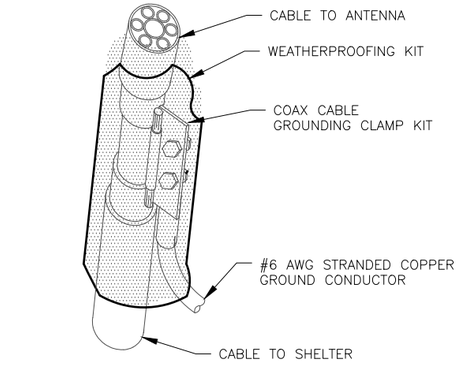
SCALE: NTS



KEY NOTES:
1. TINNED COPPER GROUND BAR 1/4"x4"x4"x20" (MIN.). NEWTON INSTRUMENT CO. CAT. NO. B-6142. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (OR EQUIVALENT)
2. 5/8" STAINLESS STEEL LOCKWASHERS
3. STAINLESS STEEL MOUNTING
4. STAINLESS STEEL BOLTS

3 G-3 TYPICAL GROUND BAR

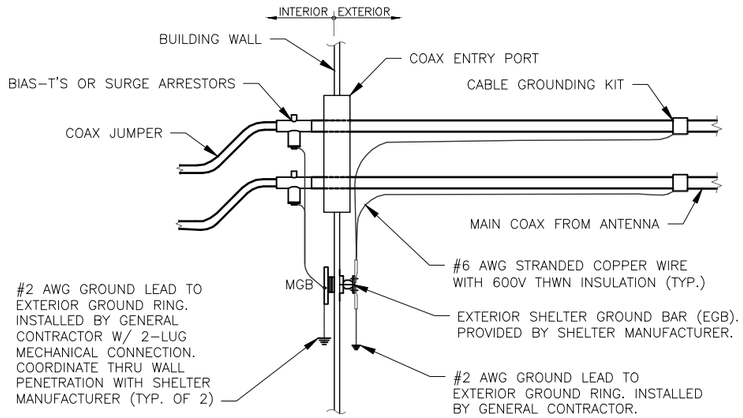
SCALE: NTS



KEY NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND.
2. ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR
3. GROUNDING KIT & WEATHER PROOFING KIT SHALL BE TYPE & PART # AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

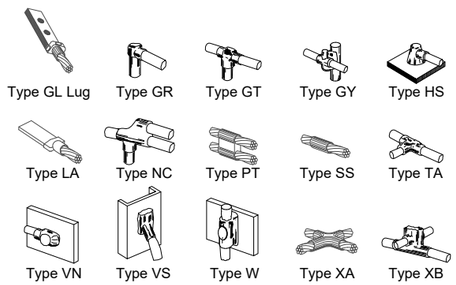
4 G-3 COAX CABLE GROUND KIT

SCALE: NTS



5 G-3 COAX GROUNDING DETAIL

SCALE: NTS



6 G-3 EXOTHERMIC CAD WELD DETAILS

SCALE: NTS

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