

# PLAN COMMISSION

City of Kaukauna  
**Council Chambers**  
Municipal Services Building  
144 W. Second Street, Kaukauna



Thursday, May 09, 2024 at 4:00 PM

## AGENDA

### In-Person

1. Roll Call.
2. Approval of Minutes.
  - [a.](#) Approve Minutes from April 18, 2024 Meeting
3. New Business.
  - [a.](#) Site Plan Change Review - U-Haul, 1550 Arbor Way
  - [b.](#) Relocate Water Treatment Facilities - City Owned Property
  - [c.](#) Park Donation Review
  - [d.](#) Disposition of City Land - Remnant Parcel, 122 Island Street
  - [e.](#) Additional Easement Review - Blue Stem Meadows 3 Plat
4. Other Business.
5. Adjourn.

## NOTICES

**IF REQUESTED THREE (3) DAYS PRIOR TO THE MEETING, A SIGN LANGUAGE INTERPRETER WILL BE MADE AVAILABLE AT NO CHARGE.**





# PLAN COMMISSION

City of Kaukauna  
**Council Chambers**  
Municipal Services Building  
144 W. Second Street, Kaukauna

Thursday, April 18, 2024 at 4:00 PM

## MINUTES

### In-Person.

1. Roll Call.

Members present: Giovanna Feller, John Moore, DPW John Neumeier, Mayor Tony Penterman, Pennie Thiele

Member(s) absent: Michael Avanzi, Brett Jensen, Ken Schoenike

Other(s) present: Associate Planner Lily Paul, Planning and Community Development Director Dave Kittel, Andy Deurr - 1800 East Apple Creek Rd; Zurieth Ahmed (via Teleconference) – 441 ½ S Railroad Street, Kimberly; Paul Gauthier of Midwest Properties; and other interested parties.

Moore made a motion to excuse the absent members. Thiele seconded the motion. The motion passed unanimously.

2. Approval of Minutes.
  - a. Approve Minutes from March 21, 2024 meeting

Feller made a motion to approve the minutes from the March 21, 2024 meeting. Moore seconded. The motion passed unanimously.

3. Public Hearing.
  - a. Public Hearing - Special Exception to allow community living arrangements/group homes, subject to Wis. Stats. § 62.23(7)(i) pursuant to Section 17.19(3) of City of Kaukauna Code of Ordinances; 154 Plank Road

Mayor Penterman declared the public hearing open. Asked three times if any one wished to speak. No one spoke. Hearing closed.

- b. Public Hearing - Special Exception to allow community living arrangements/group homes, subject to Wis. Stats. § 62.23(7)(i) pursuant to Section 17.19(3) of City of Kaukauna Code of Ordinances; 194 Plank Road

Mayor Penterman declared the public hearing open. Asked three times if any one wished to speak. No one spoke. Hearing closed.

4. New Business.
  - a. Special Exception Request - 154 Plank Road

AP Lily read and summarized public comment about the special exception request of an assisted living facility within a multi-family development. Staff assured all those whom inquired that the clientele were disabled adults that need 24 hour care, and there was little concern after that. Staff reviewed the landscaping requirements, and to bring the property in compliance, the property owner would be required to install a dumpster enclosure and a buffer yard between incompatible uses. Police and Fire have given their okay for the special exception. The Fire Inspector will still need to perform his required inspection before occupancy.

Moore made a motion to approve the special exception for 154 Plank Road with the following contingencies:

- Bring the property in compliance with Section 17.52 Landscaping Requirements: which includes a dumpster enclosure and buffer around the property, if feasible after review by staff.
- Yearly inspection done by Planning and Community Development Department or other designee to ensure compliance

Feller seconded the motion. The motion passed unanimously.

b. Special Exception Request - 194 Plank Road

Thiele made a motion to approve the special exception for 194 Plank Road with the following contingencies:

- Bring the property in compliance with Section 17.52 Landscaping Requirements: which includes a dumpster enclosure and buffer around the property, if feasible after review by staff.
- Yearly inspection done by Planning and Community Development Department or other designee to ensure compliance

Moore seconded the motion. The motion passed unanimously.

c. Ordinance Discussion - Shipping Containers

PCDD Kittel mentioned that shipping containers have showed up in the City, and there are currently no requirements regarding them. There are requirements for accessory structures, so if a resident would like to use one as so they would have to follow those regulations. Moore believes language should be put in place for shipping containers specifically, and the language should be separate between residential zones and commercial/industrial zones. DPW Neumeier would support temporary use of shipping containers in all zoning districts, and support permanent use in Industrial districts by permit. There is no support for converting shipping containers into permanent structures in residential districts. PCDD Kittel expressed that shipping containers could cause problems in terms of public health, safety, and welfare since they were not intended for permanent use. Direction was given for staff to begin drafting zoning regulations on shipping containers.

*No action was taken.*

d. Site Plan Review - Packerland Home Improvement - 2204 Tower Drive; Parcel 322092503

AP Lily presented a site plan for a 7,500 sq ft workshop and storage style building for Packerland Home Improvement. The site plan meets all covenants and zoning requirements.

Neumeier made a motion to approve the site plan for Packerland Home Improvement. Moore seconded the motion. The motion passed unanimously.

- e. Certified Survey Map Review - St. Paul Elder Services; Parcels 324034000, 324034100, 324034300, 324034400, 324043200

AP Lily explained a lot combination CSM to make all lots owned by St. Paul Elder Services into one lot. The main campus is already one large parcel, but there are a few lots that are currently being used by St. Paul Elder home, and a few that were purchased for the purpose of renovating the facility that would make sense to combine into one. There needs to be consistent zoning on all parcels before the CSM can be recorded.

Neumeier made a motion to approve the Lot Combination CSM for Parcels 324034000, 324034100, 324034300, 324034400, 324043200 with the following contingency:

- An easement is shown on the CSM where an existing storm sewer is currently Feller seconded the motion. The motion passed unanimously.

- f. Rezone Request - St. Paul Elder Services; Parcels 324034000, 324034100, 324034300, 324034400

AP Lily presented a request for St. Paul Elder Home to rezone parcels 324034000, 324034100, 324034300, 324034400 to Institutional Zoning. This would match the zoning of their main campus.

Neumeier made a motion to approve the Rezone of Parcels 324034000, 324034100, 324034300 and 324034400 from Residential Single Family (RSF) and Residential Two-Family (RTF) to Institutional District and recommend the same to the Common Council. Thiele seconded the motion. The motion passed unanimously.

- g. Letter of Support - 2024 Inflation Reduction Act Urban Forestry Grant

DPW Neumeier asked for support to apply for the Inflation Reduction Act Urban Forestry Grant. This is a 0% match grant that benefits disadvantaged communities. Grignon Park, Strassburg Park, and LaFollette Park fall into that category. City Street Crews have been working on removing diseased/dead ash trees effected by Emerald Ash Borer in those parks. AP Lily created planting and reforestation plans to help bring diversity and interest back to those parks. This grant will help fund the reforestation efforts.

Moore made a motion to approve the planting and reforestation plans and authorize the Mayor to send a letter of support for the 2024 Inflation Reduction Act Urban Forestry Grant from the Plan Commission. Feller seconded the motion. The motion passed unanimously.

5. Other Business.  
*There was no other business.*
6. Adjourn.

Moore made a motion to adjourn the meeting. Neumeier seconded the motion. The motion passed unanimously. Meeting adjourned at 5:15 PM.



# MEMO

## PLANNING AND COMMUNITY DEVELOPMENT

To: Plan Commission  
 From: Dave Kittel, Director of Planning and Community Development  
 Date: 5/3/2024  
 Re: U-Haul site plan change

U-Haul would like to add Propane services to this property and as per the Protective Covenants in this area all Site plan approvals must come from the Plan Commission. As part of this they would like to add a canopy to the site as well as storage tanks. No changes to impervious area are proposed, the canopy would be over existing parking areas and some of the parking previously planned will be slightly altered to allow for the canopy and Propane tank area. Attached is an updated site plan and information from U-Haul on how this looks at other existing facilities.

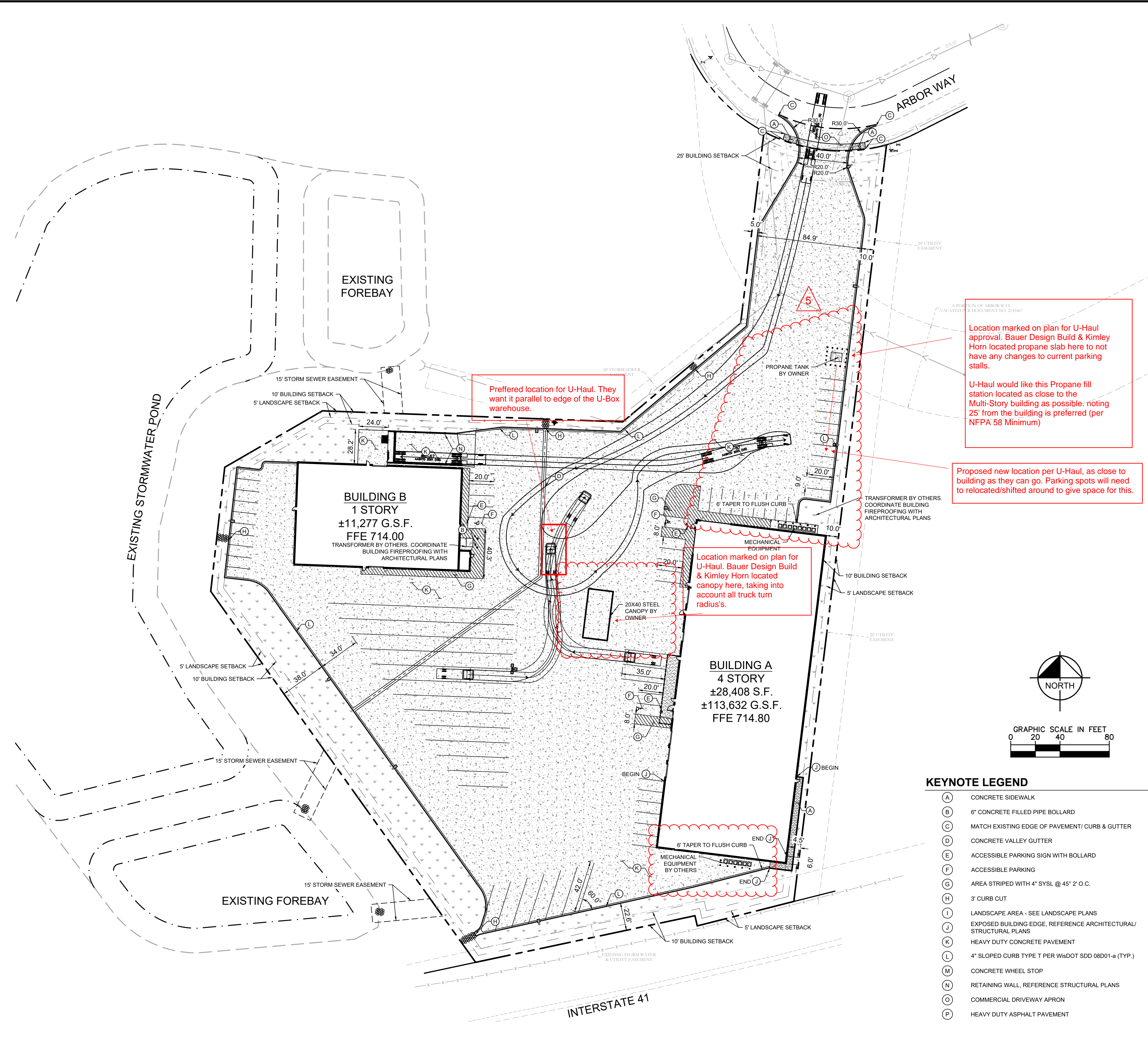
Recommendation:

**To approve the proposed changes to the site plan for U-Haul for a canopy and propane filling area contingent all state and local regulations are met.**





This document, together with the concepts and designs presented herein, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.



### LEGEND

---	PROPERTY LINE
-x-x-x-x-	PROPOSED FENCE
---	SETBACK LINE
---	RETAINING WALL
---	PROPOSED CURB AND GUTTER
---	PROPOSED HEAVY DUTY ASPHALT
---	PROPOSED STANDARD DUTY ASPHALT
---	PROPOSED HEAVY DUTY CONCRETE PAVEMENT
---	PROPOSED STORMWATER MANAGEMENT AREA
---	PROPOSED CONCRETE SIDEWALK
---	PROPOSED RIP RAP

### PROPERTY SUMMARY

U-HAUL MOVING & STORAGE	
TOTAL PROPERTY AREA	202,901 SF (4.7 AC)
PROPOSED IMPERVIOUS AREA	171,526 SF (4.0 AC)
PERCENT IMPERVIOUS ALLOWED	85.0% MAX
PERCENT IMPERVIOUS PROVIDED	84.5%
PROPOSED PERVIOUS AREA	31,375 SF (0.7AC)
PERCENT PERVIOUS REQUIRED	15.0%
PERCENT PERVIOUS PROVIDED	15.5%
TOTAL DISTURBED AREA	204,627 SF (4.7 AC)

### ZONING SUMMARY

EXISTING ZONING	CHD - COMMERCIAL HIGHWAY DISTRICT
PROPOSED ZONING	CHD - COMMERCIAL HIGHWAY DISTRICT
PARKING SETBACKS	SIDE/REAR = 5' ROAD = 5'
BUILDING SETBACKS	FRONT = 25' SIDE = 10' REAR = 10'

### BUILDING DATA SUMMARY

AREAS	
PROPOSED PROPERTY	202,901 SF (4.7 AC)
BUILDING AREA	41,685 SF (17.6% OF TOTAL PROPERTY AREA)

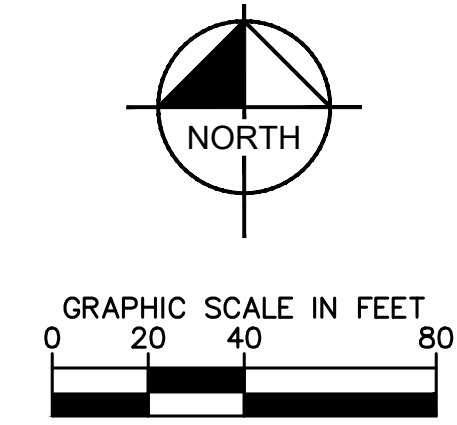
### PARKING

REQUIRED PARKING	1 SP/200 SF = 2,970/200 = 16 SPACES (RETAIL) 1 SP/300 SF = 11,277/300 = 38 SPACES (WAREHOUSE)
PROPOSED PARKING	70 SPACES
ADA STALLS REQ'D / PROVIDED	3 STALLS / 3 STALLS

- ### SITE PLAN NOTES
- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL CITY/COUNTY REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
  - CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF VESTIBULES, SLOPE PAVING, SIDEWALKS, EXIT PORCHES, TRUCK DOCKS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
  - ALL INNER CURBED RADII ARE TO BE 5' AND OUTER CURBED RADII ARE TO BE 10' UNLESS OTHERWISE NOTED. STRIPED RADII ARE TO BE 5'.
  - ALL DIMENSIONS AND RADII ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
  - EXISTING STRUCTURES WITHIN CONSTRUCTION LIMITS ARE TO BE ABANDONED, REMOVED OR RELOCATED AS NECESSARY. ALL COST SHALL BE INCLUDED IN BASE BID.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS, (UNLESS OTHERWISE NOTED ON PLANS) INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS & POLES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS AND PROJECT SITE WORK SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COST SHALL BE INCLUDED IN BASE BID.
  - SITE BOUNDARY, TOPOGRAPHY, UTILITY AND ROAD INFORMATION TAKEN FROM A SURVEY BY BLEW & ASSOCIATES, PA, DATED 02/07/2022.
  - KIMLEY-HORN ASSUMES NO LIABILITY FOR ANY ERRORS, INACCURACIES, OR OMISSIONS CONTAINED THEREIN.
  - TOTAL LAND AREA IS 4.7 ACRES.
  - PYLON / MONUMENT SIGNS SHALL BE CONSTRUCTED BY OTHERS. SIGNS ARE SHOWN FOR GRAPHICAL & INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO VERIFY SIZE, LOCATION AND ANY REQUIRED PERMITS NECESSARY FOR THE CONSTRUCTION OF THE PYLON / MONUMENT SIGN.
  - CONTRACTOR SHALL REFERENCE ARCH / MEP PLANS FOR SITE LIGHTING AND ELECTRICAL PLAN.
  - NO PROPOSED LANDSCAPING SUCH AS TREES OR SHRUBS, ABOVE AND UNDERGROUND STRUCTURES, OR OTHER OBSTRUCTIONS SHALL BE LOCATED WITHIN EXISTING OR PROPOSED UTILITY EASEMENTS AND RIGHTS OF WAY UNLESS SPECIFICALLY NOTED ON PLANS OTHERWISE.
  - REFERENCE ARCHITECTURAL PLANS FOR DUMPSTER ENCLOSURE DETAILS.
  - REFER TO FINAL PLAT OR ALTA SURVEY FOR EXACT LOT AND PROPERTY BOUNDARY DIMENSIONS.
  - ALL AREAS ARE ROUNDED TO THE NEAREST SQUARE FOOT.
  - ALL DIMENSIONS ARE ROUNDED TO THE NEAREST TENTH FOOT.
  - ALL PARKING STALLS TO BE 9' IN WIDTH AND 20' IN LENGTH UNLESS OTHERWISE INDICATED.

### KEYNOTE LEGEND

(A)	CONCRETE SIDEWALK
(B)	6" CONCRETE FILLED PIPE BOLLARD
(C)	MATCH EXISTING EDGE OF PAVEMENT/ CURB & GUTTER
(D)	CONCRETE VALLEY GUTTER
(E)	ACCESSIBLE PARKING SIGN WITH BOLLARD
(F)	ACCESSIBLE PARKING
(G)	AREA STRIPED WITH 4" SYSL @ 45° 2' O.C.
(H)	3" CURB CUT
(I)	LANDSCAPE AREA - SEE LANDSCAPE PLANS
(J)	EXPOSED BUILDING EDGE, REFERENCE ARCHITECTURAL/ STRUCTURAL PLANS
(K)	HEAVY DUTY CONCRETE PAVEMENT
(L)	4" SLOPED CURB TYPE T PER WisDOT SDD 08D01-a (TYP.)
(M)	CONCRETE WHEEL STOP
(N)	RETAINING WALL, REFERENCE STRUCTURAL PLANS
(O)	COMMERCIAL DRIVEWAY APRON
(P)	HEAVY DUTY ASPHALT PAVEMENT



ISSUED FOR CONSTRUCTION

U-HAUL MOVING & STORAGE

PREPARED FOR AMERCO REAL ESTATE CO.

KAUKAUNA

**Kimley»Horn**

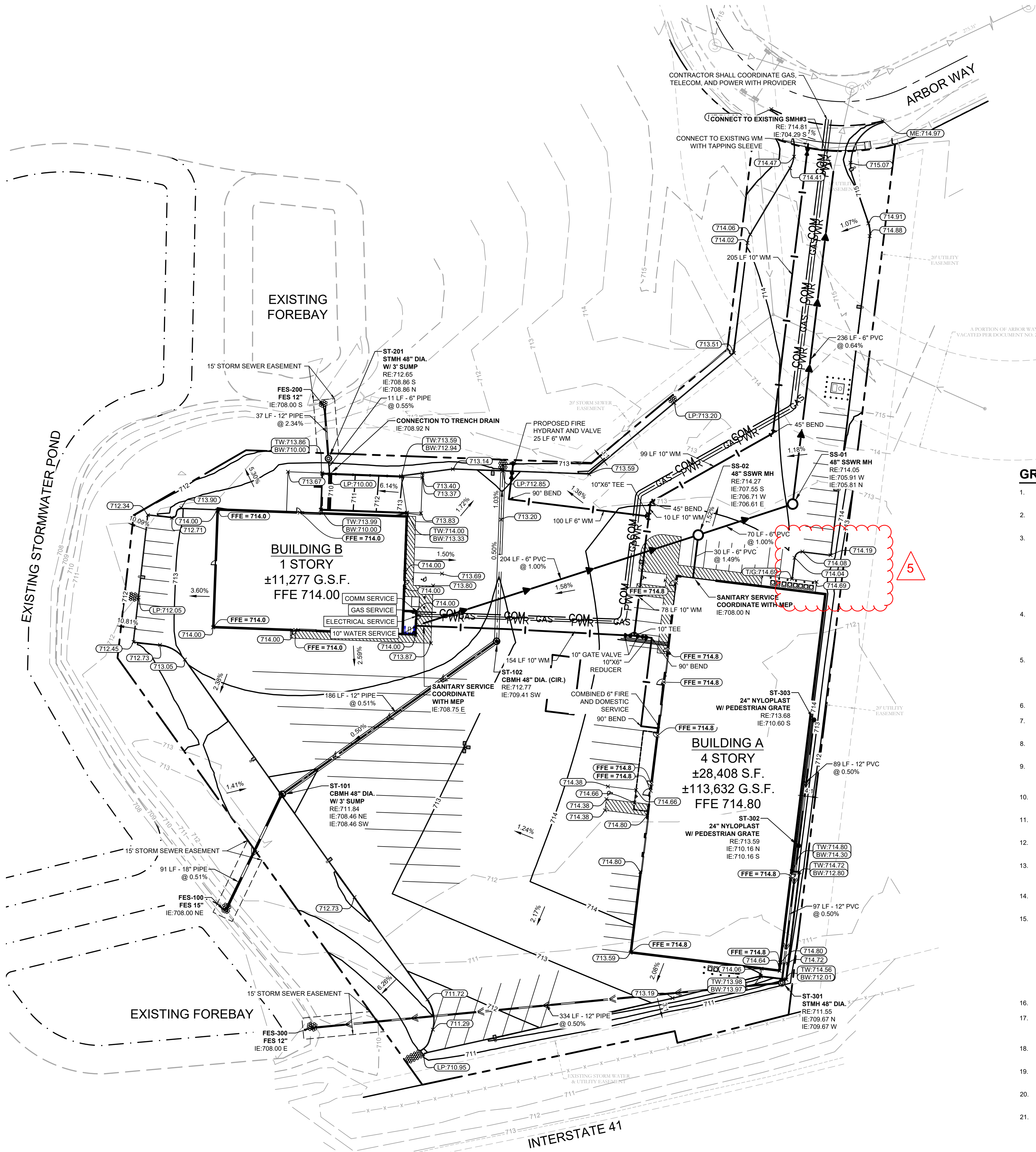
© 2022 KIMLEY-HORN AND ASSOCIATES, INC.  
767 EUSTIS STREET, SUITE 100, ST. PAUL, MN 55114  
PHONE: 651-454-4197  
WWW.KIMLEY-HORN.COM

Item 3.a.

PERMIT REVISIONS	DATE	BY
1	05/15/23	MJS
2	07/25/23	MJS
3	07/28/23	MJS
4	11/03/2023	MJS
5	03/20/2024	MJS



This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.



### LEGEND

	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR
	PROPOSED STORM MANHOLE (SOLID CASTING)
	PROPOSED STORM MANHOLE (ROUND INLET CASTING)
	PROPOSED STORM MANHOLE/ CATCH BASIN (CURB INLET CASTING)
	PROPOSED STORM SEWER CLEANOUT
	PROPOSED FLARED END SECTION
	PROPOSED RIPRAP
	PROPOSED STORM SEWER
	PROPOSED STORM SEWER
	GATE VALVE
	HYDRANT
	REDUCER
	TEE
	SANITARY SEWER MANHOLE
	SANITARY CLEANOUT
	WATERMAIN
	SANITARY SEWER
	UNDERGROUND ELECTRIC
	TELEPHONE
	GAS MAIN
	PROPOSED SPOT ELEVATION
	PROPOSED HIGH POINT ELEVATION
	PROPOSED LOW POINT ELEVATION
	PROPOSED GUTTER ELEVATION
	PROPOSED TOP OF CURB ELEVATION
	PROPOSED FLUSH PAVEMENT ELEVATION
	MATCH EXISTING ELEVATION
	PROPOSED EMERGENCY OVERFLOW
	PROPOSED DRAINAGE DIRECTION
	PROPOSED ADA SLOPE
	PROPOSED BREAK LINE

### GRADING PLAN NOTES

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CITY OF KAUKAUNA, SPECIFICATIONS AND BUILDING PERMIT REQUIREMENTS.
- CONTRACTOR TO CALL DIGGERS HOT LINE @ 1-800-242-8511 AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION/CONSTRUCTION FOR UTILITY LOCATIONS.
- STORM SEWER PIPE SHALL BE AS FOLLOWS:  
RCP PER ASTM C-76  
HDPE: 0" - 10" PER AASHTO M-252  
HDPE: 12" OR GREATER PER ASTM F-2306  
PVC SCH. 40 PER ASTM D-1785  
STORM SEWER FITTINGS SHALL BE AS FOLLOWS:  
RCP PER ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443  
PVC PER ASTM 3212  
HDPE PER ASTM D-3034, JOINTS PER ASTM D-3212
- CONTRACTOR TO FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF SITE GRADING. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.
- SUBGRADE EXCAVATION SHALL BE BACKFILLED IMMEDIATELY AFTER EXCAVATION TO HELP OFFSET ANY STABILITY PROBLEMS DUE TO WATER SEEPAGE OR STEEP SLOPES. WHEN PLACING NEW SURFACE MATERIAL ADJACENT TO EXISTING PAVEMENT, THE EXCAVATION SHALL BE BACKFILLED PROMPTLY TO AVOID UNDERMINING OF EXISTING PAVEMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
- CONTRACTOR SHALL EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS.
- GRADES SHOWN ARE FINISHED GRADES. CONTRACTOR SHALL ROUGH GRADE TO SUBGRADE ELEVATION AND LEAVE STREET READY FOR SUBBASE.
- ALL EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ANY ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
- REFER TO THE UTILITY PLAN FOR SANITARY SEWER MAIN, WATER MAIN SERVICE LAYOUT AND ELEVATIONS AND CASTING / STRUCTURE NOTATION.
- CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF PAVEMENTS AND CURB AND GUTTER WITH SMOOTH UNIFORM SLOPES TO PROVIDE POSITIVE DRAINAGE.
- INSTALL A MINIMUM OF 4" CLASS 5 AGGREGATE BASE UNDER CURB AND GUTTER AND CONCRETE SIDEWALKS.
- UPON COMPLETION OF EXCAVATION AND FILLING, CONTRACTOR SHALL RESTORE ALL STREETS AND DISTURBED AREAS ON SITE. ALL DISTURBED AREAS SHALL BE RE-VEGETATED WITH A MINIMUM OF 4" OF TOPSOIL.
- ALL SPOT ELEVATIONS/CONTOURS ARE TO GUTTER / FLOW LINE UNLESS OTHERWISE NOTED.
- GRADING FOR ALL SIDEWALKS AND ACCESSIBLE ROUTES INCLUDING CROSSING DRIVEWAYS SHALL CONFORM TO CURRENT ADA STATE/NATIONAL STANDARDS. IN NO CASE SHALL ACCESSIBLE RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL. IN NO CASE SHALL SIDEWALK CROSS SLOPES EXCEED 2%. IN NO CASE SHALL LONGITUDINAL SIDEWALK SLOPES EXCEED 5%. IN NO CASE SHALL ACCESSIBLE PARKING STALLS OR AISLES EXCEED 2% (1.5% TARGET) IN ALL DIRECTIONS. SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVING. NO CONTRACTOR CHANGE ORDERS WILL BE ACCEPTED FOR A.D.A COMPLIANCE ISSUES.
- MAINTAIN A MINIMUM OF 0.5% GUTTER SLOPE TOWARDS LOW POINTS.
- CONTRACTOR TO PROVIDE 3" INSULATION BY 5" WIDE CENTERED ON STORM PIPE IF LESS THAN 4" OF COVER IN PAVEMENT AREAS AND LESS THAN 3" OF COVER IN LANDSCAPE AREAS.
- ALL STORM SEWER CONNECTIONS SHALL BE GASKETED AND WATER TIGHT INCLUDING MANHOLE CONNECTIONS.
- ALL STORM SEWER PIPE SHALL BE AIR TESTED IN ACCORDANCE WITH THE CURRENT PLUMBING CODE.
- MAINTAIN A MINIMUM OF 1.25% SLOPE IN BITUMINOUS PAVEMENT AREAS, 0.5% SLOPE IN CONCRETE PAVEMENT AREAS.
- CONTRACTOR SHALL REVIEW PAVEMENT GRADIENT AND CONSTRUCT "INFALL CURB" WHERE PAVEMENT DRAINS TOWARD GUTTER, AND "OUTFALL" CURB WHERE PAVEMENT DRAINS AWAY FROM GUTTER.

### UTILITY PLAN NOTES

- ALL FILL MATERIAL IS TO BE IN PLACE, AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.
- SANITARY SEWER PIPE SHALL BE AS FOLLOWS:  
8" PVC SDR35 PER ASTM D-3034, FOR PIPES LESS THAN 12" DEEP  
8" PVC SDR26 PER ASTM D-3034, FOR PIPES MORE THAN 12" DEEP  
6" PVC SCHEDULE 40 PER ASTM D-1785  
DUCTILE IRON PIPE PER AWWA C150
- WATER LINES SHALL BE AS FOLLOWS:  
6" AND LARGER: PVC C-900 PER ASTM D 2241  
CLASS 200 UNDER COUNTY ROADS, OTHERWISE CLASS 150  
4" AND LARGER DUCTILE IRON PIPE PER AWWA C150  
SMALLER THAN 3" PIPING SHALL BE COPPER TUBE TYPE "K" PER ANSI 816.22 OR PVC, 200 P.S.I., PER ASTM D1784 AND D2241.
- MINIMUM TRENCH WIDTH SHALL BE 2 FEET.
- ALL WATER JOINTS ARE TO BE MECHANICAL JOINTS WITH RESTRAINTS SUCH AS THRUST BLOCKING, WITH STAINLESS STEEL OR COBALT BLUE BOLTS, OR AS INDICATED IN THE CITY SPECIFICATIONS AND PROJECT DOCUMENTS.
- ALL UTILITIES SHOULD BE KEPT TEN (10') APART (PARALLEL) OR WHEN CROSSING 18" VERTICAL CLEARANCE (OUTSIDE EDGE OF PIPE TO OUTSIDE EDGE OF PIPE OR STRUCTURE).
- CONTRACTOR SHALL MAINTAIN A MINIMUM OF 7'-5" COVER ON ALL WATERLINES.
- IN THE EVENT OF A VERTICAL CONFLICT BETWEEN WATER LINES, SANITARY LINES, STORM LINES AND GAS LINES, OR ANY OBSTRUCTION (EXISTING AND PROPOSED), THE SANITARY LINE SHALL BE SCH. 40 OR C900 WITH MECHANICAL JOINTS AT LEAST 10 FEET ON EITHER SIDE OF THE CENTER LINE OF THE CROSSING. THE WATER LINE SHALL HAVE MECHANICAL JOINTS WITH APPROPRIATE FASTENERS AS REQUIRED TO PROVIDE A MINIMUM OF 18" VERTICAL SEPARATION, MEETING REQUIREMENTS OF ANSI A21.10 OR ANSI 21.11 (AWWA C-151) (CLASS 50).
- LINES UNDERGROUND SHALL BE INSTALLED, INSPECTED AND APPROVED BEFORE BACKFILLING.
- TOPS OF MANHOLES SHALL BE RAISED AS NECESSARY TO BE FLUSH WITH PROPOSED PAVEMENT ELEVATIONS, AND TO BE ONE FOOT ABOVE FINISHED GROUND ELEVATIONS, IN GREEN AREAS, WITH WATERTIGHT LIDS.
- ALL CONCRETE FOR ENCASEMENTS SHALL HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH AT 3000 P.S.I.
- EXISTING UTILITIES SHALL BE VERIFIED IN FIELD PRIOR TO INSTALLATION OF ANY NEW LINES.
- REFER TO INTERIOR PLUMBING DRAWINGS FOR TIE-IN OF ALL UTILITIES.
- CONTRACTOR IS RESPONSIBLE FOR COMPLYING TO THE SPECIFICATIONS OF THE CITY OF KAUKAUNA AND/OR STATE OF WI WITH REGARDS TO MATERIALS AND INSTALLATION OF THE WATER AND SEWER LINES.
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
- CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES.
- CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
- CONTRACTOR SHALL REFERENCE ARCH / MEP PLANS FOR SITE LIGHTING AND ELECTRICAL PLAN.
- BACKFLOW DEVICES (DDCV AND PRZ ASSEMBLIES) AND METERS ARE LOCATED IN THE INTERIOR OF THE BUILDING. REF. ARCH / MEP PLANS.
- ALL ONSITE WATERMANS AND SANITARY SEWERS SHALL BE PRIVATELY OWNED AND MAINTAINED.
- ALL WATERMAIN STUBOUTS SHALL BE MECHANICALLY RESTRAINED WITH REACTION BLOCKING.

ISSUED FOR CONSTRUCTION

U-HAUL MOVING & STORAGE PREPARED FOR AMERCO REAL ESTATE CO.

## GRADING, DRAINAGE, AND UTILITY PLAN

KHA PROJECT	16007002
DATE	03/20/2024
SCALE	AS SHOWN
DESIGNED BY	MJS
DRAWN BY	RAY
CHECKED BY	DLE



© 2022 KIMLEY-HORN AND ASSOCIATES, INC.  
767 EULSTIS STREET, SUITE 100, ST. PAUL, MN 55114  
PHONE: 651-454-4197  
WWW.KIMLEY-HORN.COM

PERMIT REVISIONS	05/15/23	MJS	BY	DATE
CIVIL REVISIONS	07/25/23	MJS		
GRADING REVISIONS	07/28/23	MJS		
RFI 38	11/03/2023	MJS		
OWNER REVISIONS	03/20/2024	MJS		
			REVISIONS	
No.				

DESIGN CRITERIA

- 1. ALL STRUCTURAL WORK SHALL CONFORM TO THE STRUCTURAL DRAWINGS AND SPECIFICATIONS AND MEET THE REQUIREMENTS OF THE 2021 INTERNATIONAL BUILDING CODE AND THE APPLICABLE BUILDING CODE AMENDMENTS. THE ARCHITECTURAL DRAWINGS SHALL GOVERN ALL DIMENSIONS.
2. OCCUPANCY CATEGORY: I
3. ROOF LIVE LOADS: a. BASIC ROOF LIVE LOAD 5 PSF
4. SNOW LOADS (CANOPY ROOF IS NOT DESIGNED FOR SNOW LOADS. THE FABRIC ROOF SHOULD BE REMOVED WHEN SNOW OCCURS).
5. WIND LOADS: a. BASIC WIND SPEED (3-SECOND GUST) 105 MPH
6. EARTHQUAKE LOADS: a. SEISMIC IMPORTANCE FACTOR, Ie 1.0

GENERAL CONDITIONS

- 1. THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE DRAWINGS OF ALL OTHER DISCIPLINES AND SPECIFICATIONS. THE CONTRACTOR SHALL VERIFY THE REQUIREMENTS OF OTHER TRADES AS TO SLEEVES, CHASES, HANGERS, INSERT ANCHORS, HOLES, AND OTHER ITEMS TO BE PLACED OR SET IN THE STRUCTURAL WORK.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL SAFETY PRECAUTIONS AND REGULATIONS DURING THE WORK.
3. METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO FABRICATION OF ANY STRUCTURAL COMPONENTS.
5. CONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO THE ENGINEER AND/OR ARCHITECT FOR APPROVAL.
6. THE CONTRACTOR SHALL SHORE OR CRIB THE STRUCTURE FOR ALL CONSTRUCTION LOADS WHICH EXCEED THE NOTED DESIGN LOADS.
7. ALL STRUCTURAL WORK THAT IS COMPOSED OF COMPONENTS DESIGNED BY OTHERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS SUPERVISED BY THE MANUFACTURER'S REPRESENTATIVE(S) DURING THE MANUFACTURING, DELIVERY, HANDLING, STORAGE, AND ERECTION AS REQUIRED.
8. DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO APPROVAL BY THE ENGINEER.
9. ALL ASTM AND OTHER REFERENCES ARE PER THE LATEST EDITIONS OF THOSE STANDARDS, UNLESS OTHERWISE NOTED.
10. COORDINATE ALL CONSTRUCTION ACCESS AND OPERATIONS FOR ALL WORK THAT OCCURS ADJACENT TO AN EXISTING STRUCTURE AS NECESSARY TO AVOID DISRUPTION TO SAID STRUCTURE.
11. ALL STRUCTURAL CONSTRUCTION DOCUMENTS (DRAWINGS, DETAILS, CALCULATIONS, AND ALL OTHER STRUCTURAL INFORMATION) PROVIDED ARE THE PROPERTY OF U-HAUL INTERNATIONAL (AMERCO REAL ESTATE U-HAUL) AND ARE FOR USE ON THIS PROJECT ONLY.
12. THE SCOPE OF SERVICES CARRIED OUT BY U-HAUL DOES NOT INCLUDE A FIELD REVIEW DURING CONSTRUCTION UNLESS OTHERWISE AGREED UPON IN WRITING.
13. IF DRAWINGS AND CALCULATIONS ARE PROVIDED ELECTRONICALLY, COPIES OF THE ORIGINAL CONSTRUCTION DOCUMENTS AS DESIGNED BY U-HAUL HAVE BEEN RETAINED BY U-HAUL.

SHOP DRAWINGS / DEFERRED STRUCTURAL SUBMITTALS

- 1. THE CONTRACTOR SHALL SUBMIT A MINIMUM OF THREE COPIES OF THE FOLLOWING SHOP DRAWINGS (MAXIMUM SCALE 1/8" = 1'-0") TO THE ARCHITECT/ENGINEER PRIOR TO THE FABRICATION OF ANY STRUCTURAL COMPONENTS.
2. SHOP DRAWINGS AND OTHER ITEMS SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW PRIOR TO FABRICATION.
3. IN NO CASE SHALL REPRODUCTION OF THE CONTRACT DRAWINGS BE USED AS SHOP DRAWINGS.
4. DESIGN AND DETAILING SHALL BE PERFORMED USING RATIONAL ENGINEERING DESIGN PRACTICES AND BE BASED ON STANDARD PRACTICES IN ACCORDANCE WITH CONSTRUCTION DOCUMENTS AND THE BUILDING CODE AND ALL APPLICABLE BUILDING CODE AMENDMENTS.
5. THE ENGINEER'S REVIEW IS TO VERIFY CONFORMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE PERTINENT CONTRACT DOCUMENTS.
6. AS A MINIMUM, SUBMIT THE FOLLOWING ITEMS FOR REVIEW:
a. REINFORCING STEEL IN REINFORCED CONCRETE AND MASONRY CONSTRUCTION
b. ALL CONCRETE CONSTRUCTION
c. STRUCTURAL STEEL

SHOP DRAWINGS / DEFERRED STRUCTURAL SUBMITTALS (cont)

- 7. OTHER SUBMITTALS MAY BE REQUIRED PER THE SPECIFICATIONS OR THE SEPARATE NOTES CONTAINED HEREIN.
8. TEMPORARY OR PERMANENT SYSTEMS OR FRAMING MEMBERS THAT ARE NOT SPECIFICALLY DESIGNED, DETAILED, OR SPECIFIED IN THE CONTRACT DOCUMENTS BUT ARE REQUIRED TO COMPLETE THE FINISHED STRUCTURE.
9. ALL SIGNED AND SEALED SHOP DRAWINGS AND/OR CALCULATIONS THAT ARE REQUIRED TO BE SUBMITTED FOR REVIEW SHALL BE DONE BY OR UNDER THE DIRECTION OF A QUALIFIED PROFESSIONAL ENGINEER.
10. A QUALIFIED PROFESSIONAL ENGINEER IS A PROFESSIONAL ENGINEER WHO IS LEGALLY REGISTERED AND LICENSED TO PROVIDE ENGINEERING SERVICES IN THE JURISDICTION IN WHICH THE PROJECT IS LOCATED AND WHO IS EXPERIENCED IN PROVIDING ENGINEERING SERVICES RELATED TO THE WORK SUBMITTED.

FOUNDATION DESIGN

- 1. ASSUMED GEOTECHNICAL INFORMATION: a. ALLOWABLE SOIL PRESSURE 1,500 PSF
2. FOOTINGS SHALL BEAR AT LEAST 42" BELOW LOWEST ADJACENT FINISHED GRADE.
3. ALL FOOTINGS SHALL BEAR ON UNDISTURBED, FIRM NATURAL SOIL OR COMPACTED FILL CAPABLE OF SUPPORTING THE DESIGN BEARING PRESSURE NOTED HEREIN.
4. ALL SOIL SURROUNDING AND BENEATH ALL FOOTINGS, SLABS, ETC. SHALL BE PROTECTED AGAINST FROST OR FREEZING DURING CONSTRUCTION.
5. CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR FOUNDATION DESIGN WHEN A GEOTECHNICAL REPORT IS NOT PROVIDED TO THE ARCHITECT AND/OR ENGINEER.
6. CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ONSITE SOIL CONDITIONS.
7. THE CONTRACTOR SHOULD EMPLOY A PROFESSIONAL GEOTECHNICAL ENGINEER TO INSPECT THE FOUNDATIONS AND BEARING LEVELS AND VERIFY THAT THE MATERIAL ON WHICH THE FOUNDATIONS WILL BEAR HAS AT LEAST THE ABOVE NOTED CAPACITY AND GIVE RECOMMENDATIONS FOR SUBGRADE PREPARATION.
8. IMMEDIATELY NOTIFY THE ENGINEER AND/OR ARCHITECT IF UNSUITABLE SOIL OR SOIL CONDITIONS AT VARIANCE WITH THE GEOTECHNICAL REPORT IS DISCOVERED AT THE FOOTING ELEVATIONS SPECIFIED.
9. THE EXISTENCE OF UNDERGROUND STRUCTURES AND/OR UTILITIES IS NOT KNOWN.
10. WHERE FOOTINGS ARE IN CLOSE PROXIMITY OF SEWERS, DRAINS, CONDUITS, PIPES, ETC., THE BOTTOM OF FOOTING SHALL BE SET AT OR BELOW THE INVERT ELEVATION OF THE ADJACENT ELEMENT.

CAST-IN-PLACE CONCRETE

- 1. ALL REINFORCED CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE BUILDING CODE AND APPLICABLE AMENDMENTS AND THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318) OF THE AMERICAN CONCRETE INSTITUTE.
2. ALL REINFORCED CONCRETE MIX DESIGNS SHALL BE PERFORMED IN ACCORDANCE WITH THE BUILDING CODE AND APPLICABLE AMENDMENTS AND THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE" (ACI 301) OF THE AMERICAN CONCRETE INSTITUTE.
3. ALL REINFORCING STEEL FABRICATION AND PLACEMENT SHALL BE PERFORMED IN ACCORDANCE WITH THE BUILDING CODE AND APPLICABLE AMENDMENTS AND THE "MANUAL OF STANDARD PRACTICE" (CRSI MSP-11) OF THE CONCRETE REINFORCING STEEL INSTITUTE AND THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301) AND "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" (ACI 315) OF THE AMERICAN CONCRETE INSTITUTE.
4. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE (144 PCF) CONFORMING TO ASTM C94 WITH ALL CEMENT CONFORMING TO ASTM C150, TYPE I OR II.
5. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) AT 28 DAYS, SLUMP AND MAXIMUM WATER/CEMENT RATIO REQUIREMENTS: b. ALL CONCRETE 4500 PSI 2" - 4" SLUMP\* W/C RATIO = .58
6. OBTAIN EACH TYPE OF CEMENT OF THE SAME BRAND FROM THE SAME MANUFACTURER'S PLANT, EACH AGGREGATE FROM ONE SOURCE, AND EACH ADMIXTURE FROM THE SAME MANUFACTURER.
7. ALL CONCRETE EXPOSED TO WEATHER SHALL HAVE ENTRAINED AIR IN ACCORDANCE WITH SECTION 1904 OF THE IBC.
8. FOR AIR ENTRAINED CONCRETE - MAXIMUM W/C RATIO = .44
9. ALL GROUT SHALL BE NONMETALLIC SHRINKAGE-RESISTANT GROUT PROVIDED BY A MANUFACTURER APPROVED IN WRITING BY THE STRUCTURAL ENGINEER AND INSTALLED AND MIXED PER THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
10. REINFORCEMENT: a. DEFORMED BARS ASTM A615, GRADE 60 b. GALVANIZED REINFORCEMENT ASTM A767, CLASS II
11. REINFORCING STEEL SHALL HAVE THE FOLLOWING MINIMUM CLEAR CONCRETE COVER UNLESS OTHERWISE NOTED: a. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3" b. CONCRETE SURFACES IN CONTACT WITH SOIL OR EXPOSED TO EARTH OR WEATHER (#6 BARS OR LARGER) 2" (#5 BARS OR SMALLER) 1-1/2" c. COLUMN TIES OR SPIRALS AND BEAM STIRRUPS 1-1/2" d. CONCRETE SURFACES NOT IN CONTACT WITH SOIL OR EXPOSED TO WEATHER INCLUDING WALLS AND TOP AND BOTTOM OF SLABS 1"
12. WELDING OF REINFORCING BARS IS PROHIBITED WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
13. SPLICED BARS SHALL HAVE A MINIMUM LAP OF CLASS B TENSION LAP SPLICE PER TYPICAL DETAILS.
14. GALVANIZED REINFORCING SHALL BE TREATED TO PREVENT REDUCTION OF BOND.
15. ALL REINFORCING STEEL INDICATED AS BEING CONTINUOUS (CONT.) ON THE PLANS AND DETAILS SHALL BE LAPPED WITH A CLASS B SPLICE OR 36 x BAR DIAMETER (WHICHEVER IS GREATER) UNLESS OTHERWISE NOTED.
16. REINFORCING BARS TO EXTEND 12 BAR DIAMETERS BUT NOT LESS THAN 12" BEYOND BAR BENDS, UNLESS OTHERWISE NOTED.
17. PROVIDE ADDITIONAL BARS AS SHOWN IN TYPICAL DETAILS.
18. ALL REINFORCING STEEL SHALL BE SET AND TIED IN PLACE PRIOR TO POURING OF CONCRETE.
19. PROVIDE CORROSION RESISTANT ACCESSORIES SUCH AS PLASTIC COATED (NOT PLASTIC TIPPED) OR STAINLESS STEEL CHAIRS IN ALL EXPOSED CONCRETE CONSTRUCTION.
20. ALL EXPOSED CORNERS OF CONCRETE TO HAVE 3/4" MINIMUM CHAMFER UNLESS OTHERWISE NOTED.
21. CONCRETE SHALL BE DISCHARGED AT THE SITE WITHIN 1-1/2 HOURS AFTER WATER HAS BEEN ADDED TO THE CEMENT AND AGGREGATE.
22. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL CONCRETE OPENINGS AND/OR PENETRATIONS REQUIRED FOR OTHER TRADES PRIOR TO PLACING CONCRETE.
23. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR REGLETS, PIPE SLEEVES, CONDUITS OR OTHER ITEMS TO BE EMBEDDED OR PASSED THROUGH CONCRETE.

CONCRETE/MASONRY ANCHORS

- 1. EXPANSION BOLTS INTO CONCRETE AND CONCRETE MASONRY UNITS SHALL BE KWIK BOLT TZ (ICC ESR-1917) AS MANUFACTURED BY THE HILTI CORP. OR AN APPROVED EQUIVALENT IN STRENGTH AND EMBEDMENT.
2. ADHESIVE ANCHORS SHALL BE HIT-RE 500-SD (ICC ESR-2322) INTO CONCRETE AND HIT HY 150 MAX (ESR-1967) INTO MASONRY AS MANUFACTURED BY THE HILTI CORP. OR AN APPROVED EQUIVALENT IN STRENGTH AND EMBEDMENT.
3. ALL ANCHORS SHALL BE INSTALLED WITH STEEL WASHERS.
4. WHEN USING ADHESIVE ANCHORING SYSTEMS THE MANUFACTURER SHALL SUPPLY THE ANCHOR AND ADHESIVE, UNLESS OTHERWISE NOTED.
5. ALL ALTERNATE PRODUCTS SHALL HAVE A CURRENT ICC EVALUATION REPORT.
6. ANCHORS INSTALLED INTO MASONRY UNITS SHALL BE INTO FULLY GROUTED CELLS UNLESS OTHERWISE NOTED.
7. ALL ANCHORS SHALL BE APPROVED FOR USE WITH CRACKED CONCRETE AND CONFORM TO CURRENT ICC ESR REPORT (ICC-ES AC193 FOR MECHANICAL ANCHORS AND ICC-ES AC308 FOR ADHESIVE ANCHORS).
8. INSTALL ALL ANCHORS IN STRICT ACCORDANCE WITH ALL APPLICABLE ICC-ES AND BUILDING CODE REQUIREMENTS.
9. ALL PERSONNEL INSTALLING MECHANICAL/ADHESIVE ANCHORS SHALL BE TRAINED BY THE PRODUCT MANUFACTURER ON PROPER INSTALLATION TECHNIQUES.

STRUCTURAL STEEL

- 1. ALL STRUCTURAL STEEL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE BUILDING CODE AND APPLICABLE AMENDMENTS AND WITH THE "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" (1989 EDITION) OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
2. ALL STRUCTURAL STEEL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE BUILDING CODE AND APPLICABLE AMENDMENTS AND WITH THE 13TH EDITION OF THE "STEEL CONSTRUCTION MANUAL" OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
3. GRADE OF STEEL a. OTHER SHAPES, PLATE, AND BARS ASTM A36 b. HOLLOW STRUCTURAL SHAPES (HSS) ASTM A500, GRADE B c. STEEL PIPE ASTM A53 TYPE E, GR. B d. GALVANIZED STRUCTURAL STEEL ASTM A123 e. STRUCTURAL SHAPES AND RODS ASTM A153 f. ANCHOR RODS ASTM F1554, GR. 36 g. THREADED ROD ASTM A36
4. ALL FIELD CONNECTIONS SHALL USE BOLTS, UNLESS OTHERWISE NOTED.
5. HARDENED WASHERS CONFORMING TO ASTM F436 SHALL BE USED AT A325 BOLTS AND A490 BOLTS USED IN FRICTION CONNECTION AND OVERSIZED AND SHORT SLOTTED HOLES.
6. ALL MODIFICATIONS REQUIRED FOR OTHER TRADES SHALL BE SHOWN ON THE SHOP DRAWINGS, AND MADE DURING SHOP FABRICATION.
7. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 "STRUCTURAL WELDING CODE-STEEL".
8. ALL EXTERIOR METAL FABRICATIONS EXPOSED TO WEATHER SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.

SPECIAL STRUCTURAL INSPECTIONS

- 1. THE OWNER WILL HIRE AN INSPECTION AGENCY OR RETAIN THE ENGINEER OF RECORD TO PERFORM ALL REQUIRED SPECIAL INSPECTIONS AND TEST.
2. SPECIAL STRUCTURAL INSPECTIONS SHALL BE CONDUCTED AND DOCUMENTED AS PER CHAPTER 17 OF THE IBC AND ALL APPLICABLE AMENDMENTS FOR THE FOLLOWING ITEMS OR AS REQUIRED BY THE BUILDING OFFICIAL:
a. STEEL CONSTRUCTION
b. CONCRETE CONSTRUCTION
c. ANCHOR BOLTS IN PRE-DRILLED HOLES IN CONCRETE OR IN MASONRY
d. SITE SOIL CONDITIONS (AS REQUIRED; SEE FOUNDATION DESIGN NOTES)
3. ALL SPECIAL INSPECTIONS SHALL BE CONDUCTED BY A QUALIFIED SPECIAL INSPECTOR AS DETERMINED BY THE BUILDING OFFICIAL AND/OR PERFORMED UNDER THE SUPERVISION OF THE ENGINEER OF RECORD.
4. A STATEMENT OF SPECIAL STRUCTURAL INSPECTION IN ACCORDANCE WITH SECTION 1705 OF THE IBC SHALL BE SUBMITTED TO THE BUILDING OFFICIAL PRIOR TO BEGINNING OF ANY SPECIAL STRUCTURAL INSPECTIONS BY THE SPECIAL INSPECTOR.
5. SPECIAL STRUCTURAL INSPECTION REPORTS SHALL BE FURNISHED TO THE BUILDING OFFICIAL AND THE ENGINEER OF RECORD IN ACCORDANCE WITH SECTION 1704 OF THE IBC.

SHEET NOTES:

Table with 10 columns and 1 row for Revisions.

REVISIONS:

Table with 10 columns (NO., DATE, INITIALS, NOTES) for Revisions.

PROFESSIONAL SEAL:

Professional Seal area for signature and stamp.

ARCHITECT LOGO:



CONSTRUCTION DEPARTMENT
2727 NORTH CENTRAL AVENUE
PHOENIX, ARIZONA 85004
PH: (602) 263-6502

SITE ADDRESS:
U-Haul Moving & Storage
Of Iowa City
1600 Hwy 1 W,
Iowa City IA 52240

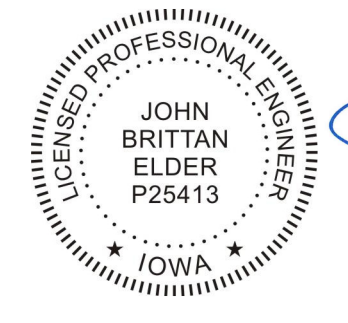
SHEET CONTENTS:

General Structural
Notes For
Steel Shade Canopy

932073

DRAWN: GM
CHECKED: DG
DATE: 11/13/2023

932073\_S-1



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.
JOHN BRITTAN ELDER
11/21/2023
Signature: John Brittan Elder
Date: 11/21/2023
License number #P25413
My license renewal date is December 31, 2024.
Pages or sheets covered by this seal: 1

SHEET NOTES:

REVISIONS:

NO.	DATE	INITIALS	NOTES
1			
2			
3			
4			
5			
6			
7			
8			

PROFESSIONAL SEAL:

Professional Seal area

ARCHITECT LOGO:

Architect Logo area

AMERCO REAL ESTATE COMPANY

CONSTRUCTION DEPARTMENT  
2727 NORTH CENTRAL AVENUE  
PHOENIX, ARIZONA 85004  
PH: (602) 263-6502

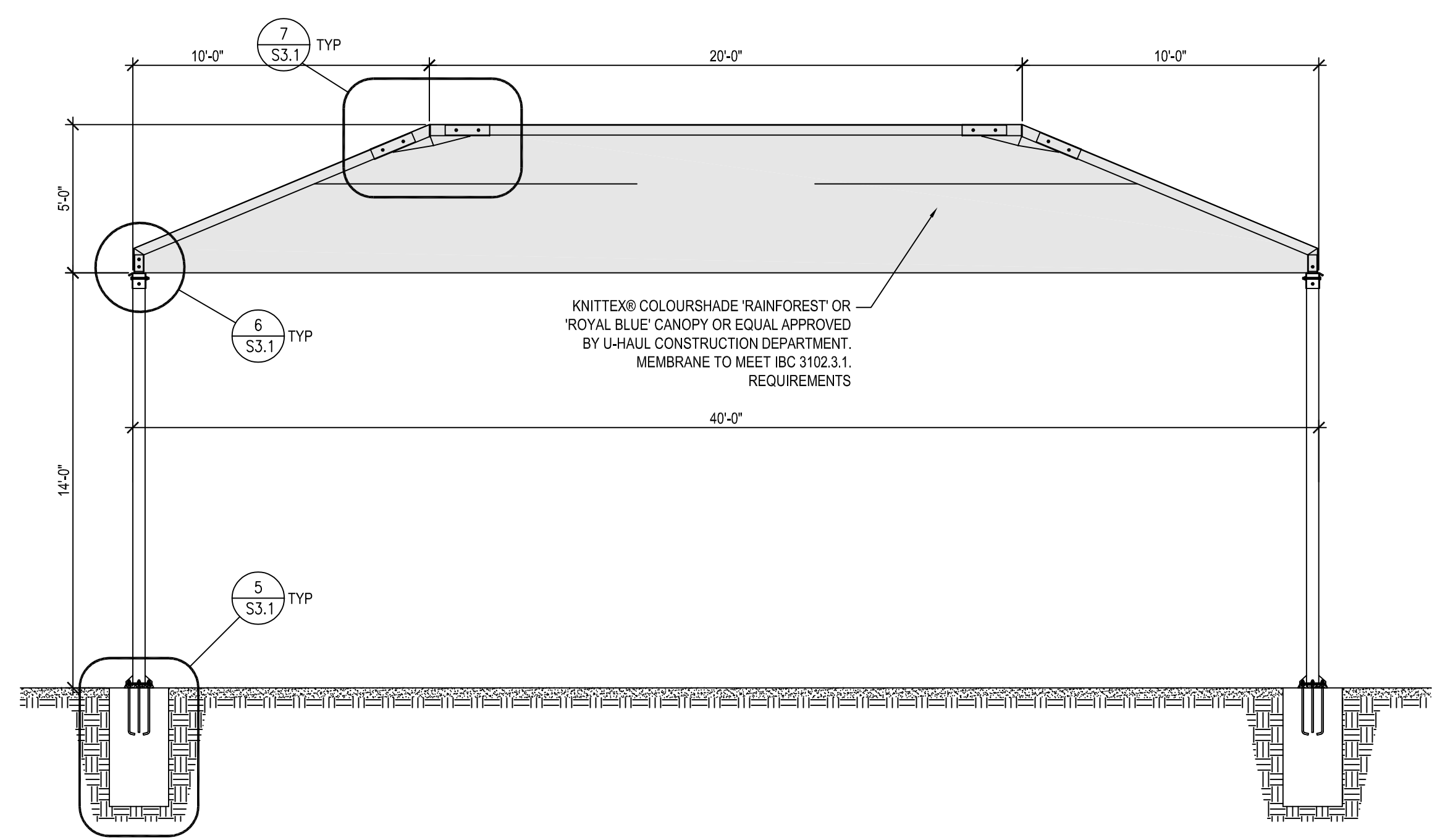
SITE ADDRESS:  
U-Haul Moving & Storage  
Of Iowa City  
1600 Hwy 1 W,  
Iowa City IA 52240

SHEET CONTENTS:  
Plans and Elevations  
for 20x40'  
Steel Shade Canopy

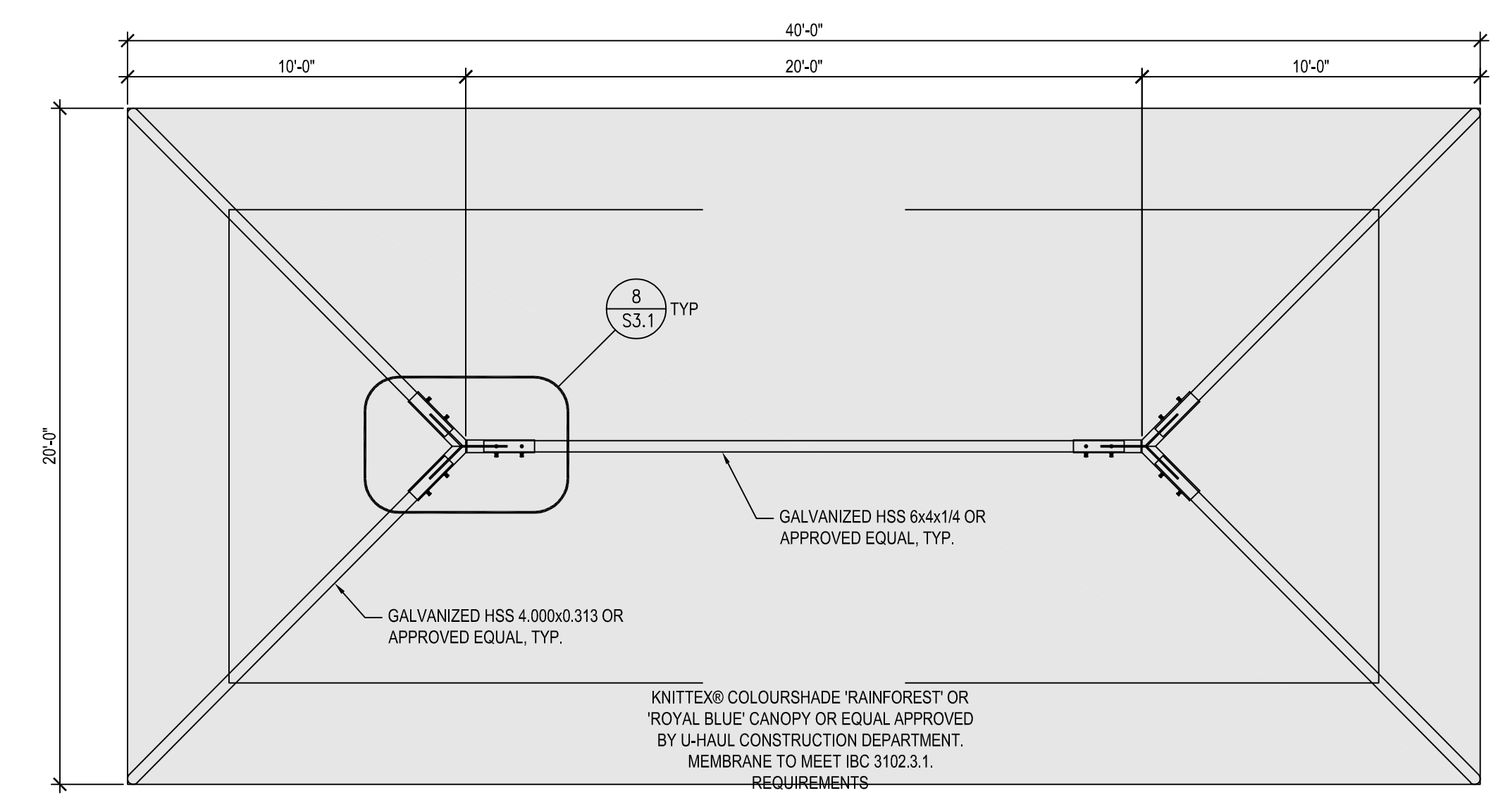
932073

DRAWN: GM  
CHECKED: DG  
DATE: 11/13/2023

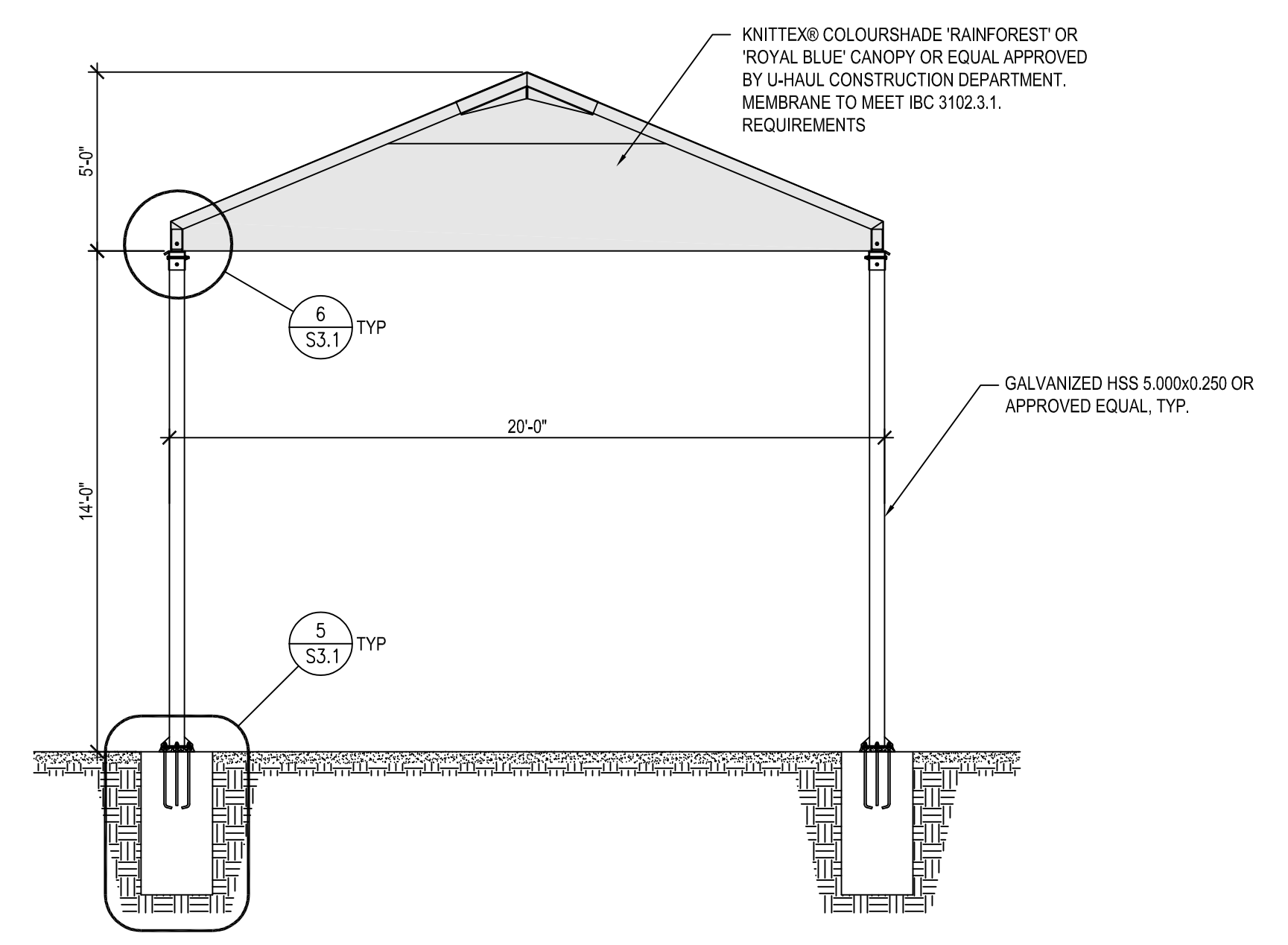
932073\_S-1



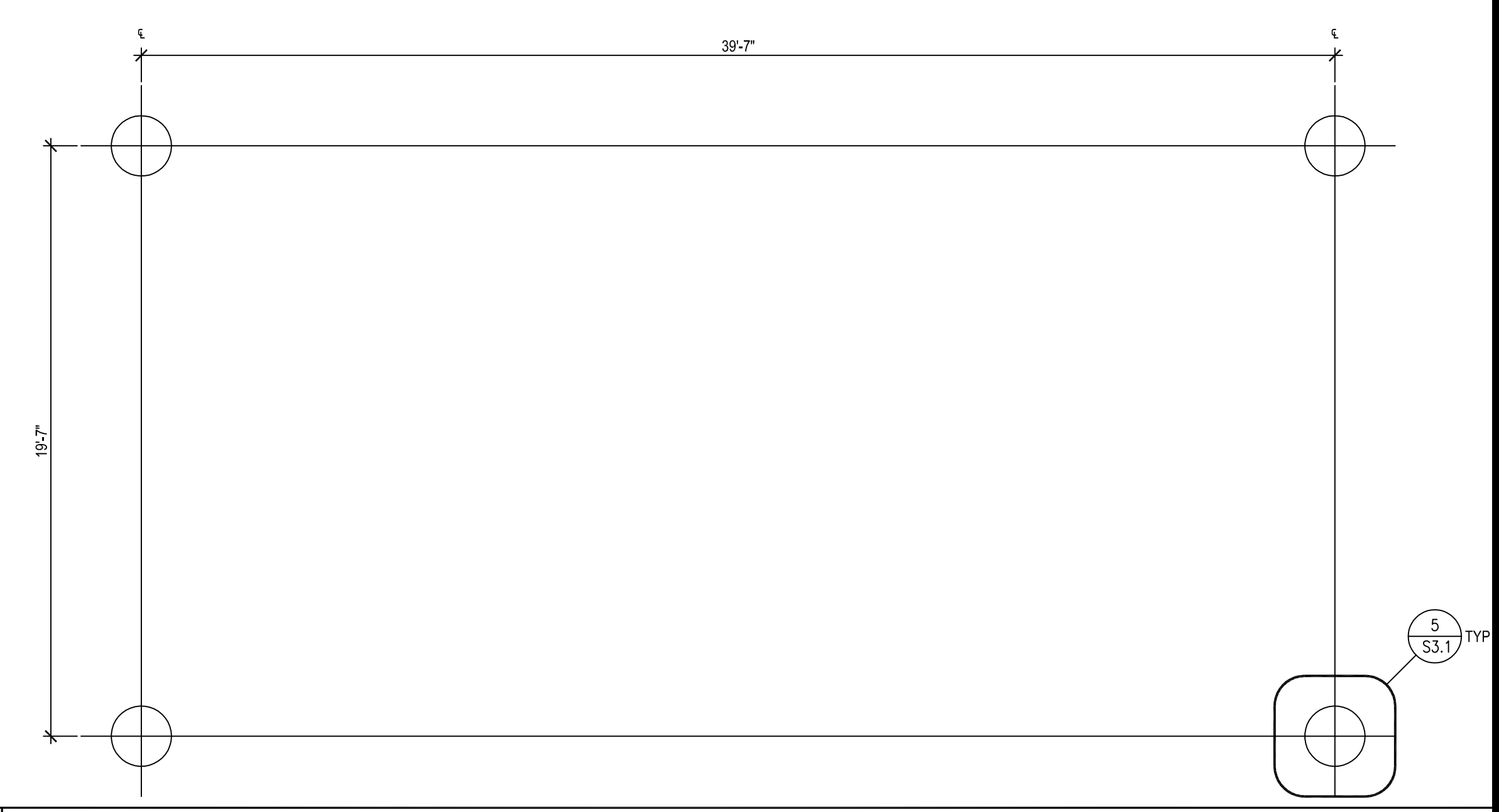
3 20x40' STEEL CANOPY SIDE ELEVATION SCALE: 1/4" = 1'-0"



2 20x40' STEEL CANOPY PLAN SCALE: 1/4" = 1'-0"



4 20x40' STEEL CANOPY SIDE ELEVATION SCALE: 1/4" = 1'-0"



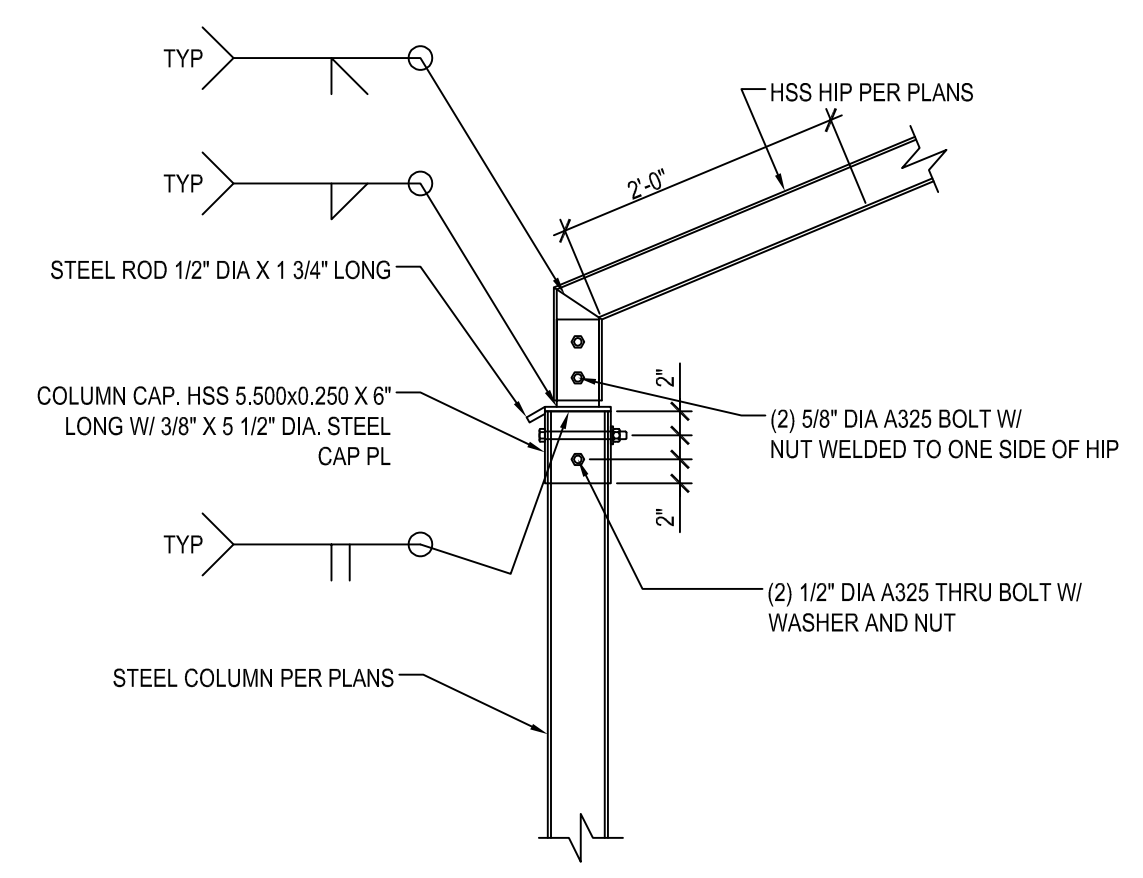
1 20x40' STEEL CANOPY FOUNDATION PLAN SCALE: 1/4" = 1'-0"

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

JOHN BRITTAN ELDER P25413  
 (signature) 11/21/2023  
 SEAL John Brittan Elder License number #P25413 My license renewal date is December 31, 2024. Pages or sheets covered by this seal:



© 2023 AMERCO REAL ESTATE COMPANY



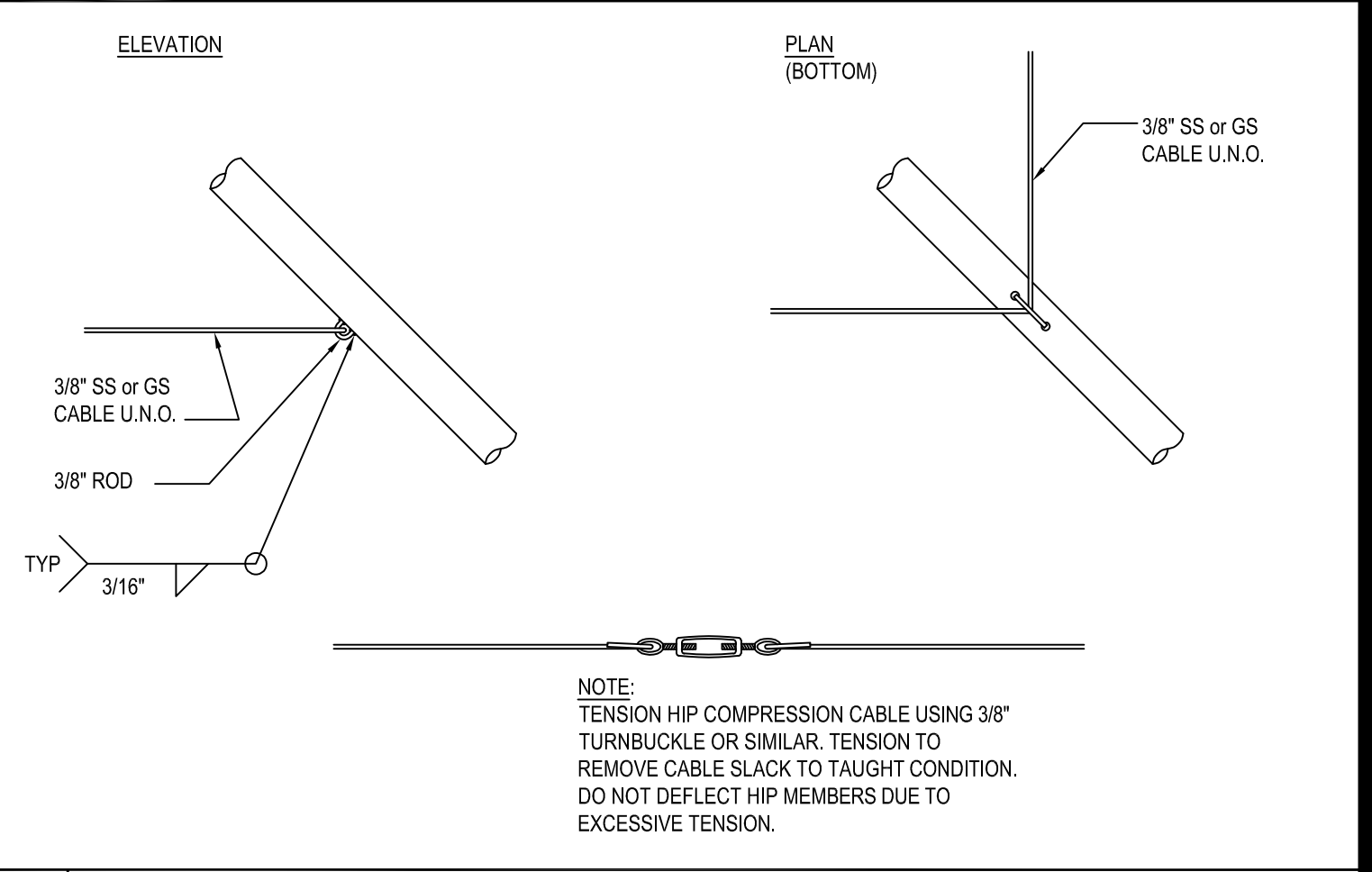
6C 20'x40' STEEL CANOPY COLUMN CAP DETAIL SCALE: 3/4" = 1'-0"

REINFORCING DEVELOPMENT LENGTH OF STANDARD HOOKS TABLE-TYPICAL U.N.O.

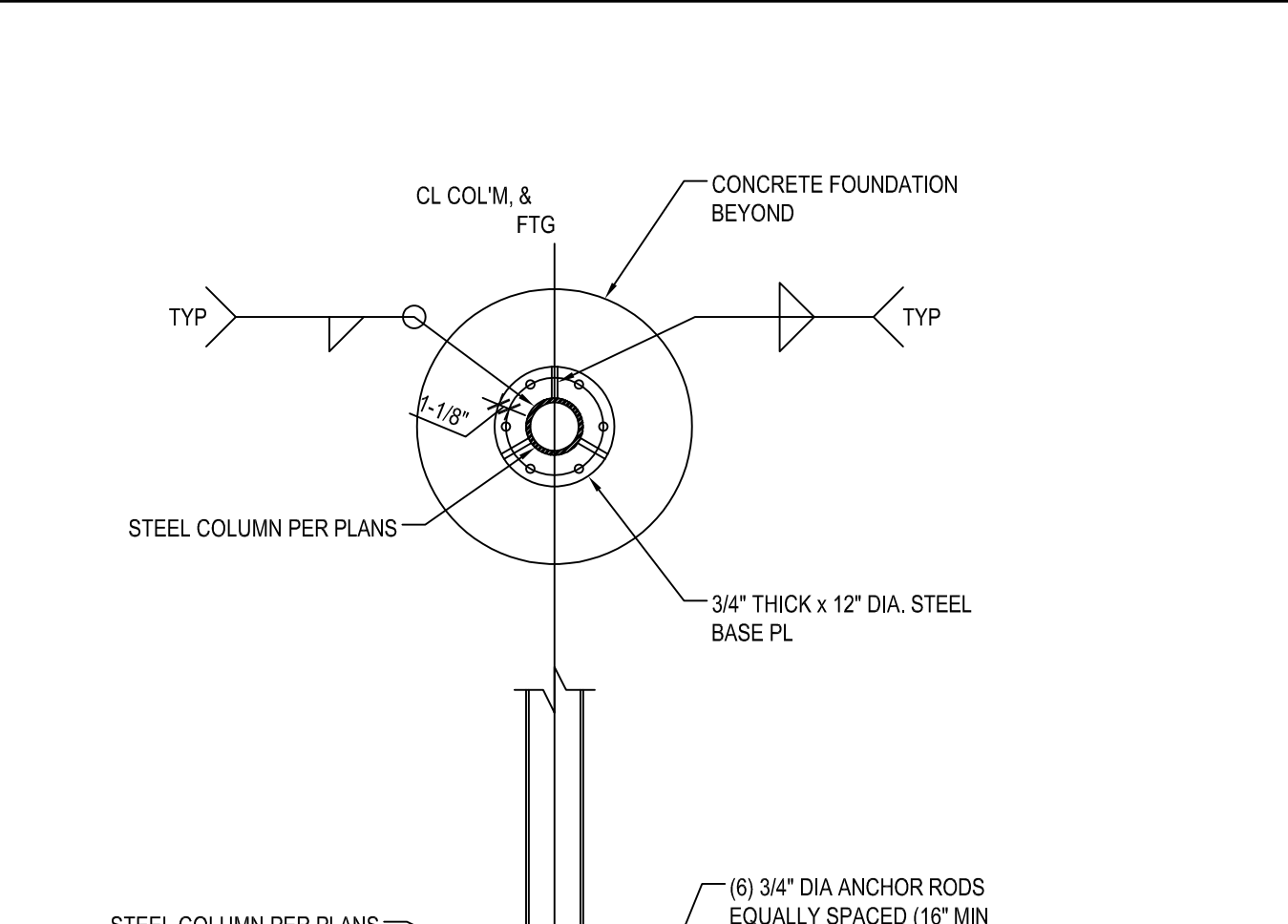
BAR SIZE	CONCRETE		MASONRY	
	ALL	ALL	ALL	ALL
#3	9	5	5	5
#4	11	6	6	6
#5	14	8	8	8
#6	17	9	9	9
#7	20	10	10	10
#8	22	12	12	12
#9	25	-	-	-
#10	28	-	-	-
#11	31	-	-	-
#14	-	-	-	-
#18	-	-	-	-

TABLE NOTES:  
 1. DEVELOPMENT LENGTHS ARE CALCULATED PER ACI 318-05, 12.2.3, EQ. (12-1) FOR CONCRETE AND ACI 530-05, 2.1.10.5.1 FOR MASONRY.  
 2. DEVELOPMENT LENGTH SHALL BE INCREASED BY 30% FOR LIGHTWEIGHT CONCRETE.

4 REINF. DVLPMNT STANDARD HOOKS TABLE SCALE: NO SCALE



9C HIP COMPRESSION CABLE SCALE: 3/4" = 1'-0"



6C 20'x40' STEEL CANOPY FOUNDATION DETAIL SCALE: 3/4" = 1'-0"

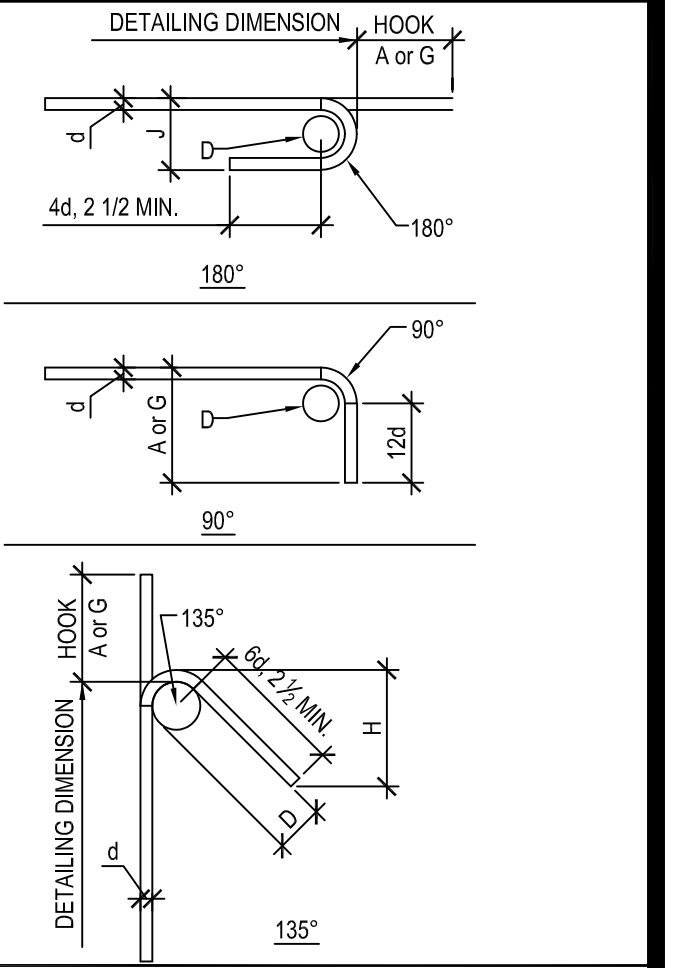
RECOMMENDED END HOOKS (ALL GRADES)  
 D=FINISHED BEND DIAMETER

BAR SIZES	180° HOOKS			90° HOOKS	
	D (in.)	A or G	J	A or G	A or G
#3	2 1/4	5	3	6	6
#4	3	6	4	8	8
#5	3 3/4	7	5	10	10
#6	4 1/2	8	6	1-0	1-0
#7	5 1/4	10	7	1-2	1-2
#8	6	11	8	1-4	1-4
#9	7	13	10	1-6	1-6
#10	8	15	12	1-8	1-8
#11	9	17	14	2-0	2-0
#14	11	23	18	2-4	2-4
#18	14	30	23	3-0	3-0

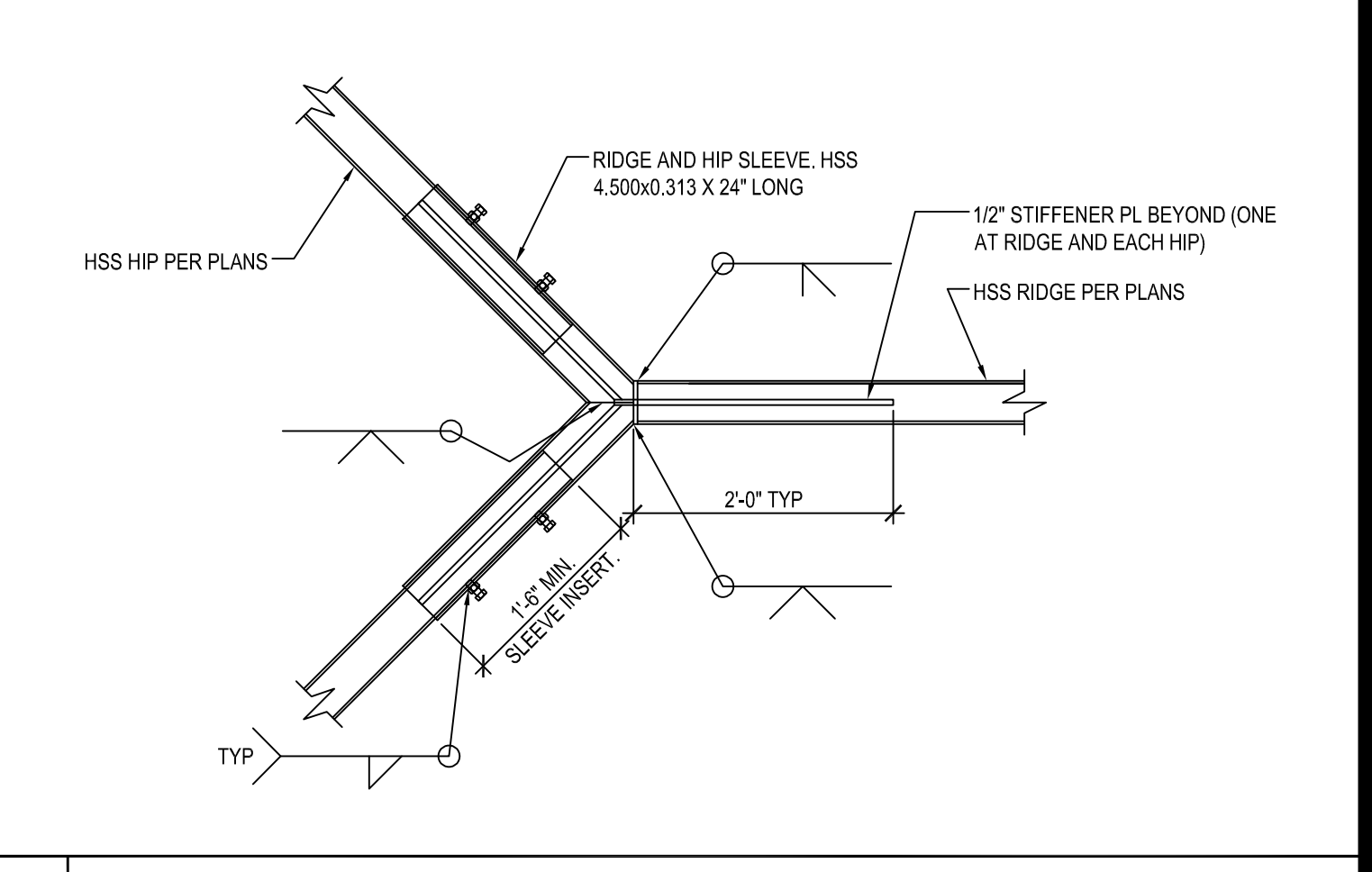
SEISMIC STIRRUP/TIE HOOK DIMENSIONS

BAR SIZES	135° HOOKS		90° HOOKS	
	D (in.)	A or G	A or G	A or G
#3	1 1/2	4 1/4	3	4
#4	2	4 1/2	3	4 1/2
#5	2 1/2	5 1/2	3 3/4	6
#6	3	6	4 1/2	8
#7	3 1/2	7	5 1/4	9
#8	4	8	6	10

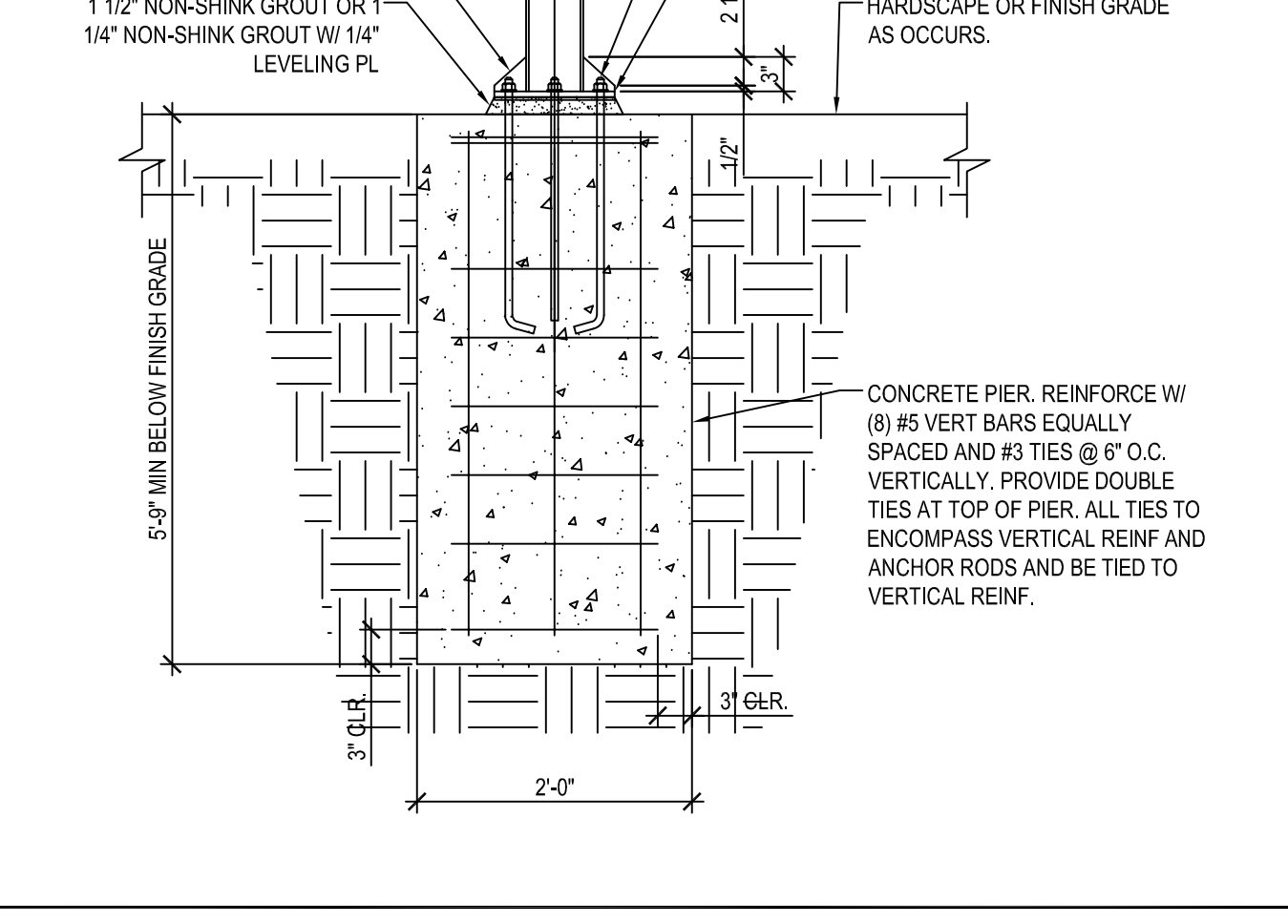
ALL SPECIFIC SIZES RECOMMENDED BY CRSI BELOW MEET MINIMUM REQUIREMENTS OF ACI 318



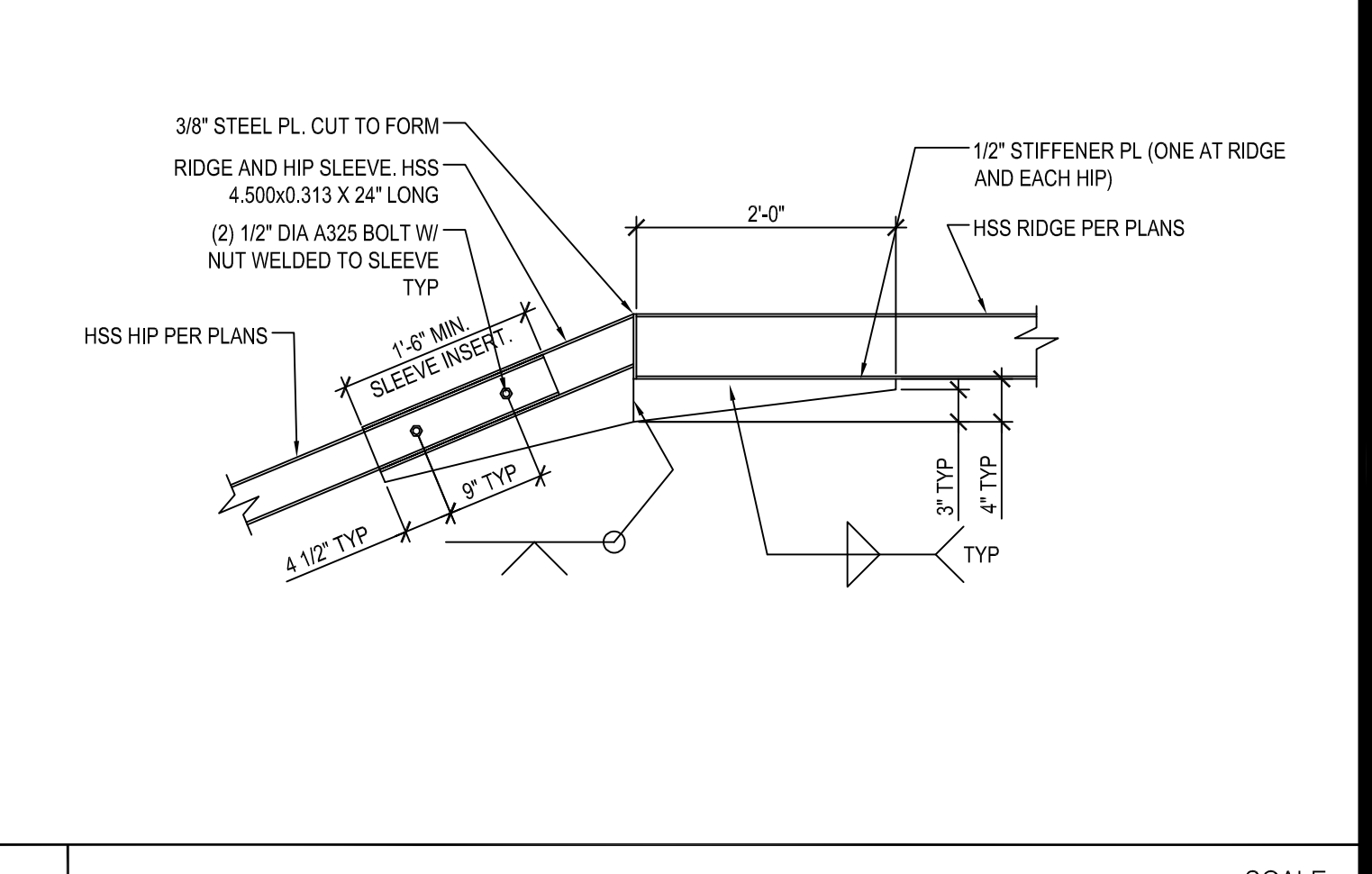
3 REINFORCING STANDARD HOOKS SCALE: NO SCALE



8C 20'x40' STEEL CANOPY HIP/RIDGE DETAIL SCALE: 3/4" = 1'-0"



6C 20'x40' STEEL CANOPY FOUNDATION DETAIL SCALE: 3/4" = 1'-0"



7C 20'x40' STEEL CANOPY HIP DETAIL SCALE: 3/4" = 1'-0"

LAP SPLICE LENGTHS (IN.)

BAR SIZE	LAP CLASS	LENGTHS (IN.)											
		2500 PSI		3000 PSI		3500 PSI		4000 PSI		4500 PSI		5000 PSI	
		TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	A	24	36	18	27	22	33	17	25	20	30	16	23
#3	B	31	46	24	36	28	42	22	33	26	39	20	29
#4	A	32	47	24	36	29	43	22	33	27	40	21	31
#4	B	41	61	32	47	38	56	29	43	35	52	27	40
#5	A	39	59	30	45	29	44	28	42	33	50	28	41
#5	B	51	77	39	59	47	70	38	54	43	65	35	51
#6	A	47	71	36	54	43	65	33	50	40	60	31	46
#6	B	61	92	47	71	58	84	43	65	56	84	46	67
#7	A	69	103	53	79	63	94	48	72	58	87	45	67
#7	B	89	134	69	103	81	122	63	94	78	113	58	87
#8	A	78	117	60	90	72	107	55	83	66	99	61	77
#8	B	102	153	78	117	93	139	72	107	86	129	66	99
#9	A	88	132	68	102	81	121	62	93	78	112	58	86
#9	B	113	172	88	132	105	157	81	121	97	146	75	112
#10	A	100	149	77	115	91	136	70	106	84	126	65	97
#10	B	129	194	100	149	118	177	91	136	109	164	84	126
#11	A	110	165	85	127	101	151	78	118	93	140	72	108
#11	B	143	215	110	165	131	196	101	151	121	182	93	140
#14	A	133	194	102	153	121	181	93	140	112	168	84	124
#14	B	177	265	136	204	161	242	124	181	148	224	115	172
#18	A	143	215	110	165	131	196	101	151	121	182	93	140
#18	B	194	291	153	230	181	271	140	215	174	265	136	204

1 LAP SPLICE SCHEDULE FOR UNCOATED CONCRETE REINFORCING BARS SCALE: NO SCALE

Detail Notes:  
 1. TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL WEIGHT CONC.  
 2. TENSION LAP-SPLICE LENGTHS ARE CALCULATED PER ACI 318, SECTIONS 12.15. TABULATED VALUES FOR BEAMS OR COLUMNS ARE BASED ON TRANSVERSE REINFORCEMENT AND CONCRETE COVER MEETING MIN. CODE REQUIREMENTS.  
 3. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL ELEMENT, CONCRETE COVER, AND CENTER-TO-CENTER SPACING OF THE BARS ARE DEFINED AS:  
 BEAM OR COLUMNS:  
 CASE 1 - COVER AT LEAST 1.0 db AND CENTER-TO-CENTER SPACING AT LEAST 2.0 db  
 CASE 2 - COVER LESS THAN 1.0db OR CENTER-TO-CENTER SPACING LESS THAN 2.0 db.  
 ALL OTHERS:  
 CASE 1 - COVER AT LEAST 1.0 db AND CENTER-TO-CENTER SPACING AT LEAST 3.0db.  
 CASE 2 - COVER LESS THAN 1.0 db OR CENTER-TO-CENTER SPACING LESS THAN 3.0 db  
 4. ACI 318 DOES NOT ALLOW LAP SPLICES OF #14 OR #18 BARS. THE TABULATED VALUES FOR THOSE BAR SIZES ARE THE TENSION DEVELOPMENT LENGTHS.  
 5. TOP BARS ARE HORIZ. BARS WITH MORE THAN 12 IN. OF CONCRETE CAST BELOW THE BARS.  
 6. FOR GRADE 40 REINFORCING BARS, MULTIPLY TABULATED VALUES BY 0.67 (1/2" LAP MIN.). FOR LIGHT WEIGHT CONC., MULTIPLY TABULATED VALUES BY 1.3.

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

JOHN BRITTAN ELDER P25413  
 (signature) 11/21/2023  
 SEAL John Brittan Elder License number #P25413 My license renewal date is December 31, 2024. Pages or sheets covered by this seal.

SHEET NOTES:

REVISIONS:

NO.	DATE	INITIALS	NOTES

PROFESSIONAL SEAL:

ARCHITECT LOGO:

AMERCO REAL ESTATE COMPANY

CONSTRUCTION DEPARTMENT  
 2727 NORTH CENTRAL AVENUE  
 PHOENIX, ARIZONA 85004  
 PH: (602) 263-6502

SITE ADDRESS:  
 U-Haul Moving & Storage  
 Of Iowa City  
 1600 Hwy 1 W,  
 Iowa City IA 52240

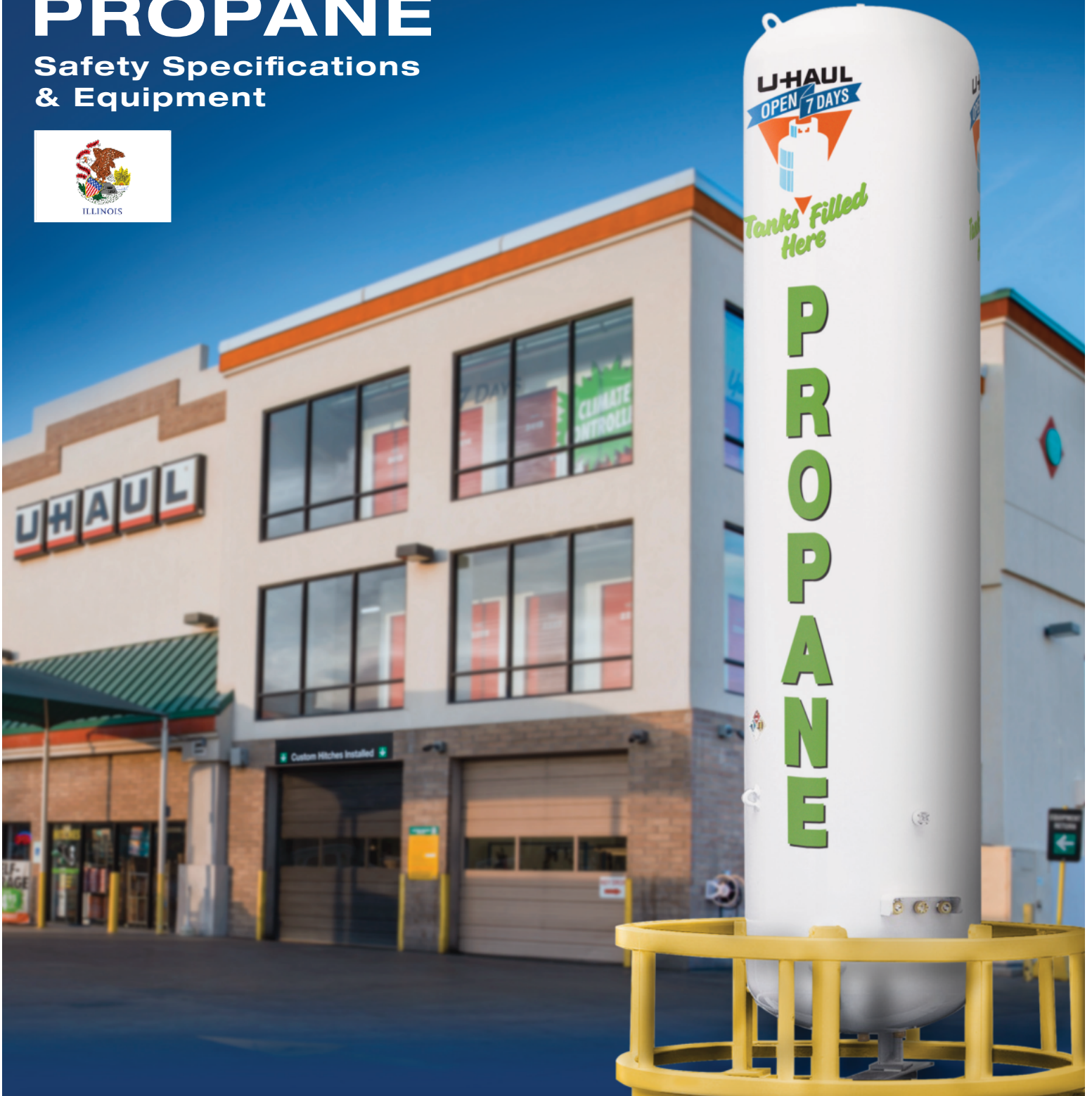
SHEET CONTENTS:  
 Structural Details  
 For Steel  
 Shade Canopy

932073  
 DRAWN: GM  
 CHECKED: DG  
 DATE: 11/13/2023  
 932073\_5-1



# PROPANE

## Safety Specifications & Equipment



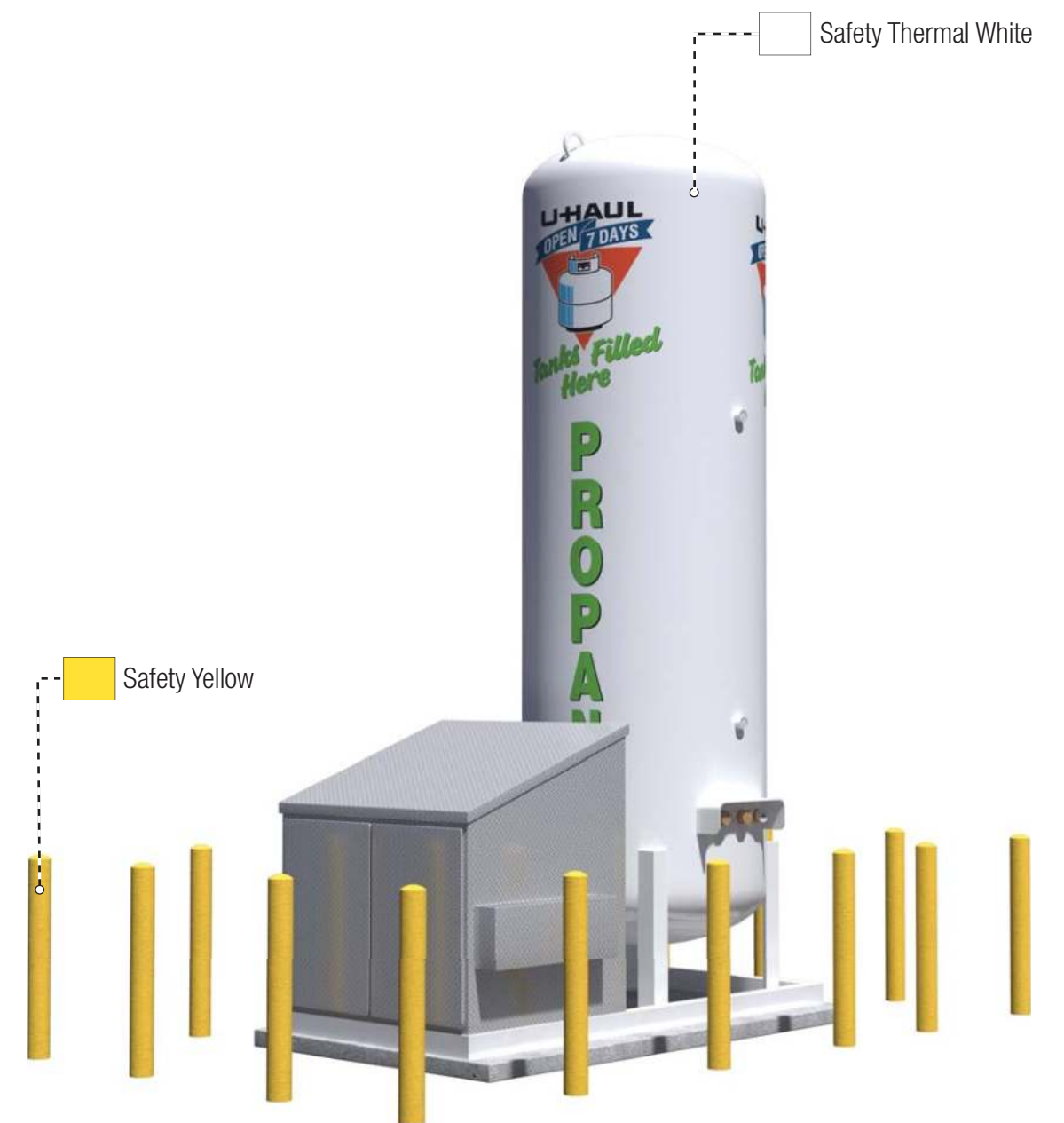
**U-Haul® Moving and Storage of Moline**  
5000 Avenue of the Cities • Moline IL, 61265

# ELEVATION

ELEVATION





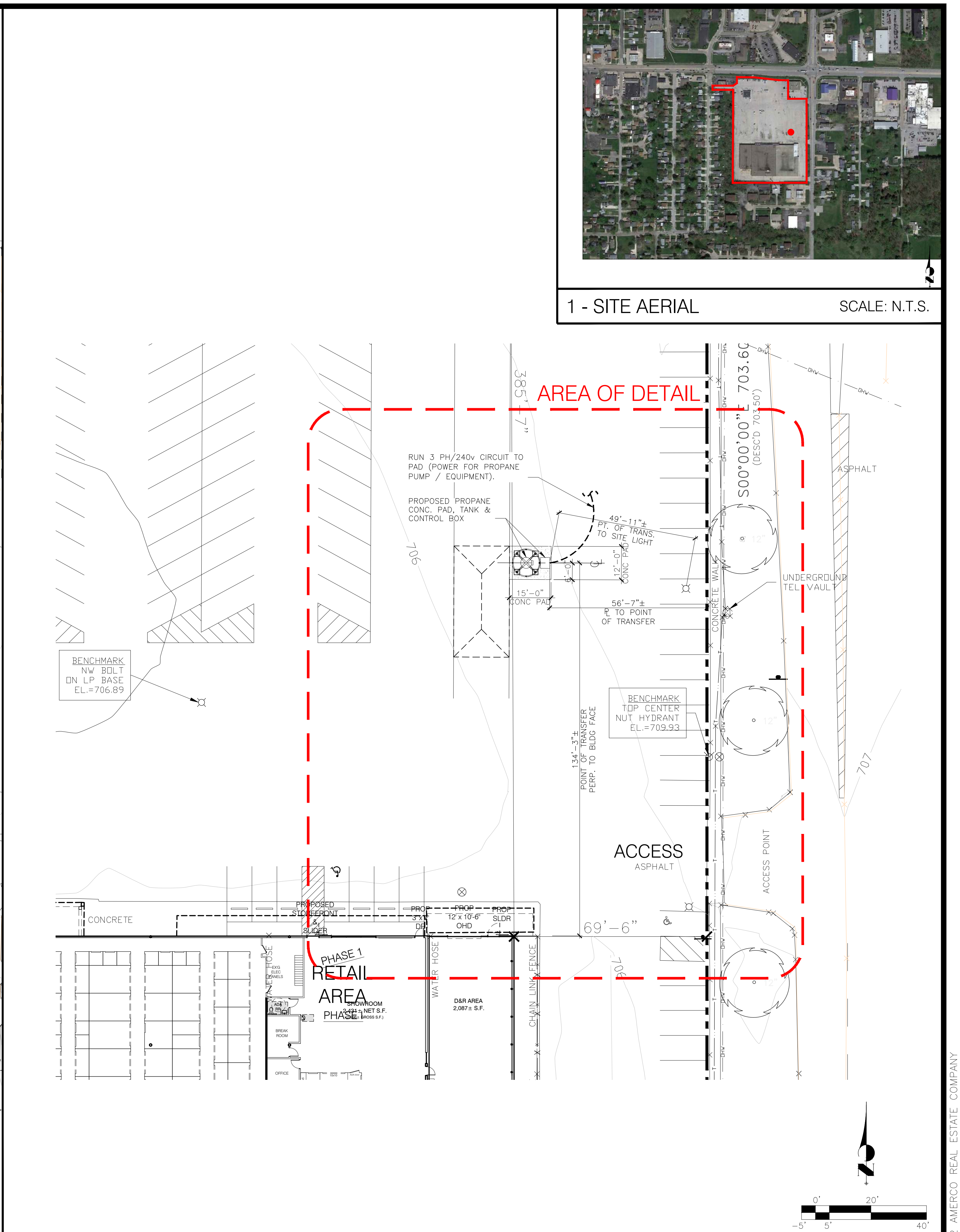
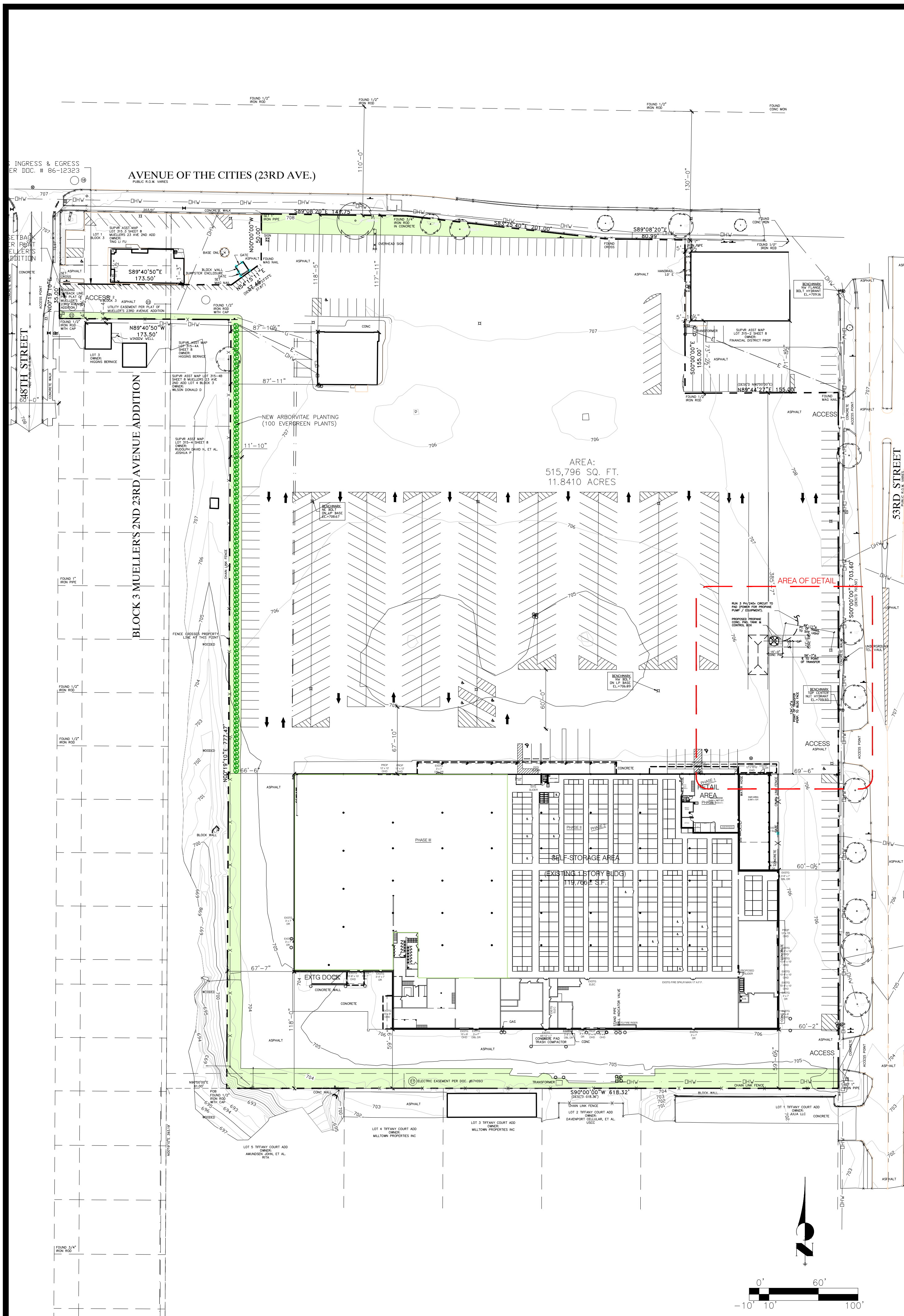




# SITE MAP

SITE MAP





SHEET NOTES:				
NO.	DATE	INITIALS	NOTES	
9				
10				
11				
12				
13				
14				
15				
16				

REVISIONS:				
NO.	DATE	INITIALS	NOTES	
1				
2				
3				
4				
5				
6				
7				
8				

PROFESSIONAL SEAL:

*PRELIMINARY DOCUMENTS;  
NOT FOR CONSTRUCTION;  
FOR INFORMATION ONLY.*

ARCHITECT LOGO:

**AMERCO**  
REAL ESTATE COMPANY

CONSTRUCTION DEPARTMENT  
2727 NORTH CENTRAL AVENUE  
PHOENIX, ARIZONA 85004  
P: (602) 263-6502

SITE ADDRESS:  
U-HAUL OF MOLINE  
4902 Avenue of the Cities  
MOLINE, IL 61265

SHEET CONTENTS:  
SITE PLAN -  
PROPOSED  
PROPANE PAD  
LOCATION

932077

DRAWN: KMB  
CHECKED: NH  
DATE: 04/05/22

932077A1L

SP2

2 - SITE PLAN - PROPOSED PROPANE PAD LOCATION

SCALE: 1" = 60'-0"

3 - SITE PLAN DETAIL - PROPOSED PROPANE PAD LOCATION

SCALE: 1" = 20'-0"

# EMERGENCY RELIEF

IN THE WAKE OF A HURRICANE



EMERGENCY RELIEF

## Storm Prep Reminder: Check Propane before Nate Arrives

**PHOENIX, Ariz. (Oct. 6, 2017)** — U-Haul International and its many propane suppliers are reminding people to fill their propane generators and additional propane cylinders prior to the onset of major storms during the ongoing hurricane season.

Tropical Storm Nate has already been blamed for multiple fatalities in Central America, and the storm is expected to gain strength and become a hurricane as it heads north through the Gulf of Mexico toward the U.S. Officials in Louisiana have declared a state of emergency and ordered some evacuations in coastal areas.

U-Haul, the largest retailer of propane in U.S., has kept a constantly stocked supply of propane at its full-service facilities before and after Hurricanes Harvey and Irma brought massive flooding to Texas, Florida and other regions in and around the Gulf Coast. Propane is again well stocked in anticipation of Nate’s arrival.

Find U-Haul propane locations at <https://www.uhaul.com/Propane/>.

“It’s important for people to consider their propane supply in preparing for Nate and other major storms that approach the U.S.,” said John Barnett, U-Haul propane program manager. “You don’t want to run out of a primary power source. If the flooding and damage from a storm is severe, getting to a propane location after a storm may be difficult.”

Propane is important to have in the aftermath of storms in order to power generators, heaters, stoves and grills for cooking, propane-fueled refrigerators, and machinery used for recovery efforts. As a clean-burning fuel, propane is among the most dependable energy sources during weather-related crises. Power outages nullify electric generators, while generators requiring gas and oil can create gunk and stall. Propane is also optimal for performing under temperature swings that high winds can cause.

U-Haul is offering 30 days of free self-storage at 36 facilities across Louisiana, Mississippi and Alabama to anyone who stands to be impacted by Nate. [Find a list of participating facilities here.](#)

In addition to its 30 days free self-storage disaster relief program, U-Haul is proud to be at the forefront of aiding communities in times of need as an official American Red Cross Disaster Responder.

### ***About U-Haul***

*Since 1945, U-Haul has been the No. 1 choice of do-it-yourself movers, with a network of more than 21,000 locations across all 50 states and 10 Canadian provinces. U-Haul Truck Share 24/7 now offers customers access to U-Haul trucks every hour of every day through the self-service options on their internet-connected mobile devices. U-Haul customers’ patronage has enabled the U-Haul fleet to grow to more than 150,000 trucks, 112,000 trailers and 40,000 towing devices. U-Haul offers more than 581,000 rooms and more than 51 million square feet of self-storage space at owned and managed facilities throughout North America. U-Haul is the largest*

*installer of permanent trailer hitches in the automotive aftermarket industry and is the largest retailer of propane in the U.S.*

**Contact:**

Jeff Lockridge

Sebastien Reyes

E-mail: [publicrelations@uhaul.com](mailto:publicrelations@uhaul.com)

Phone: 602-263-6981

Website: [uhaul.com](http://uhaul.com)

# NFPA 58

NFPA-( NATIONAL FIRE PROTECTION ASSOCIATION ) 58-( LIQUID PETROLEUM-GAS )



NFPA58

A. ASME Vertical Container Notes:

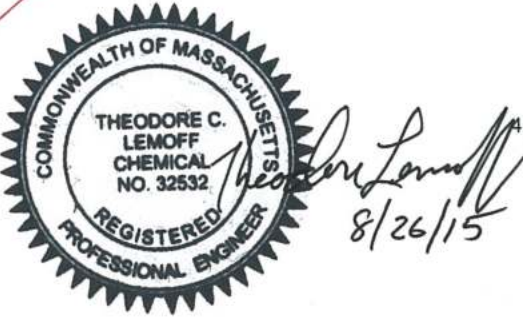
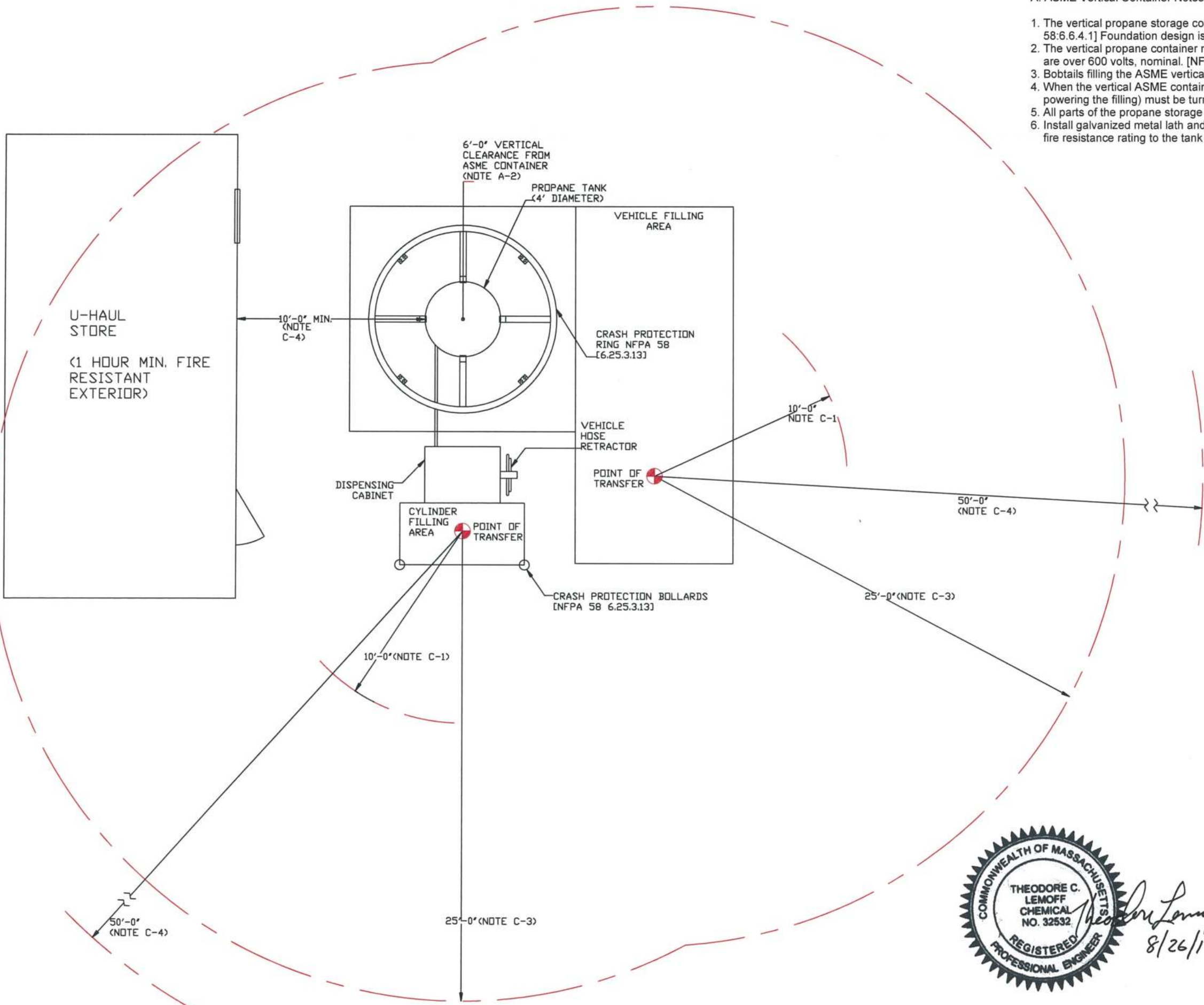
1. The vertical propane storage container foundation to be designed to resist wind and seismic forces at the location. [NFPA 58:6.6.4.1] Foundation design is covered in other documents to be provided by Uhaul.
2. The vertical propane container must be at least 6 ft. from the vertical plane beneath overhead electric power lines that are over 600 volts, nominal. [NFPA58: 6.4.4.13]
3. Bobtails filling the ASME vertical container must be at least 10 ft. from the vertical ASME container. [NFPA 58:7.2.3.3]
4. When the vertical ASME container is being filled, all internal combustion engines on vehicles (other than the engine powering the filling) must be turned off within 15 ft. of the vertical container. [NFPA 58:7.2.3.2 (A)]
5. All parts of the propane storage and dispensing system must be at least 25 ft. from pits. [NFPA 58: 6.25.2.2]
6. Install galvanized metal lath and 3/8" Pyrocrete to vertical tank legs per tank installation instructions to provide a 2 hour fire resistance rating to the tank supports. [NFPA 58: 5.2.7.1 (B)]

B. Dispensing Notes:

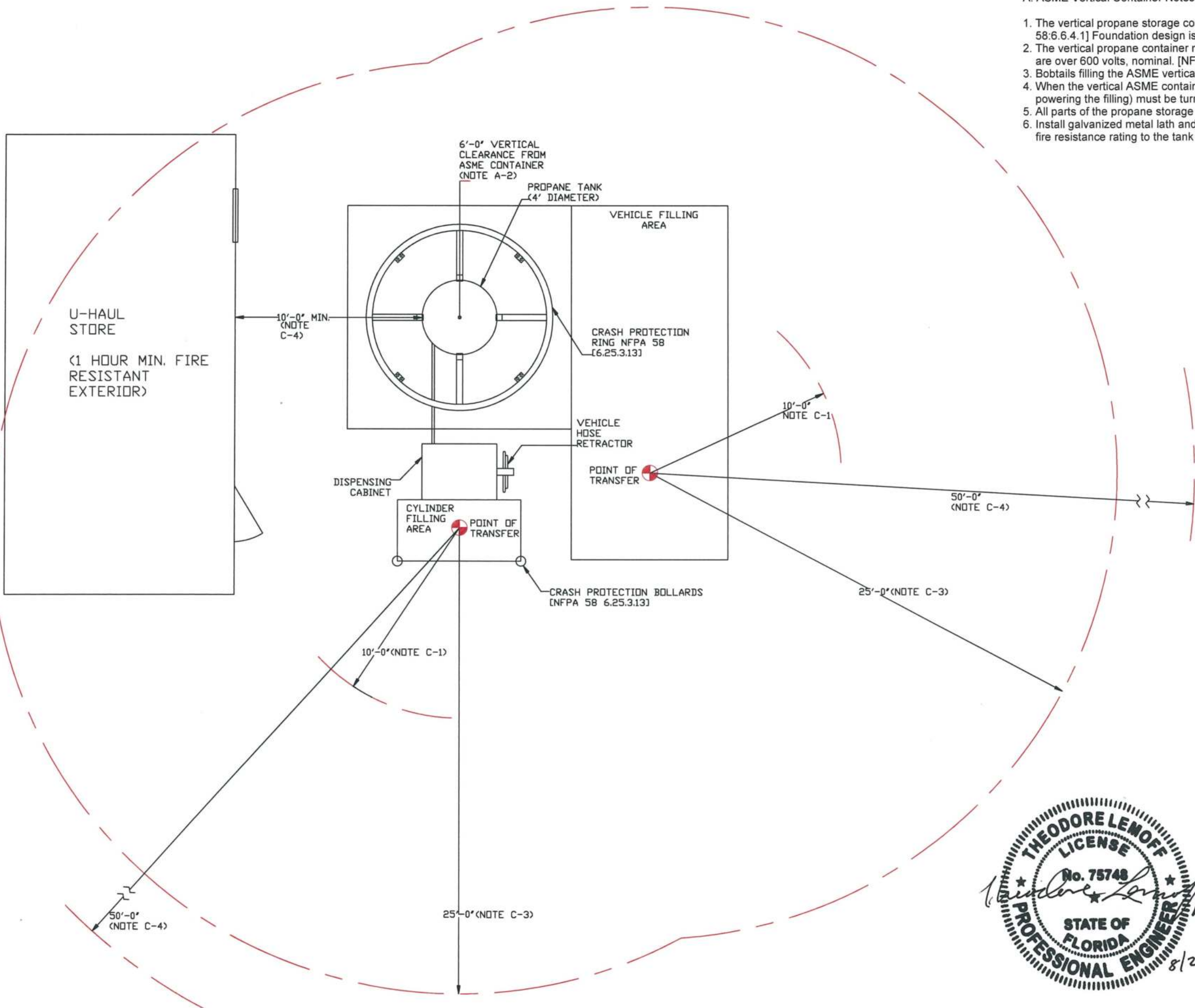
1. Filling propane cylinders and propane vehicle fuel containers to be conducted only by trained employees. [NFPA 58: 7.2.1.1]
2. Trained employees to remain in attendance during all propane transfer operations. [NFPA 58: 7.2.1.2]
3. Cylinders, other than engine fuel cylinders, older than 12 years from the date of manufacture or 5 or 12 years from recertification (marked on the cylinder) via the visual or hydrostatic recertification method cannot be filled until recertified. (Not applicable to ASME containers installed on vehicles.) [NFPA 58: 5.2.2.2]
4. Only cylinders fabricated to U. S. Department of Transportation and the ASME Boiler and Pressure Vessel Code Section VIII can be filled with propane. [NFPA 58: 5.2.1.1]
5. Minimum 15 ft. from the point of transfer to areas where cell phones, electrical equipment, and other sources of ignition are used during propane transfer. [NFPA 58: 6.23.2.2]
6. Minimum 35 ft. from the points of transfer to metal cutting, grinding, oxygen-fuel cutting, brazing, soldering, or welding during propane transfer operations. [NFPA 58: 7.2.3.2 (C)]
7. Dispensing systems must be secured when dispensing service is not offered. [NFPA 58: 6.25.3.7]
8. A station to stop the LP-Gas pump must be located at the pump. [NFPA 58: 6.25.3.4]
9. Locate the actuator for the emergency shutoff valve within 3 ft. of each point of transfer. [NFPA 58: 6.25.3.9]
10. An emergency stop switch must be located between 20 ft. and 100 ft. from the points of transfer and dispensing cabinet and identified with signs visible from the points of transfer. [NFPA 58: 6.25.3.17]

C. Drawing Notes:

1. Minimum 10 ft. from the points of transfer to:
  - a. Buildings with a 1 hour or greater fire rated walls (i.e. wood buildings and building walls with windows). [NFPA 58: Table 6.5.2.1 (A)]
  - b. Public ways, including public streets, highways, thoroughfares and sidewalks. [NFPA 58: Table 6.5.2.1 (F) (1)]
  - c. LP-Gas containers other than those being filled or waiting to be filled. [NFPA 58: Table 6.5.2.1 (I)]. (Does not apply to the vertical propane storage container at the Uhaul site.)
2. Minimum of 15 ft. from the points of transfer to:
  - a. Internal combustion engines during transfer of propane, other than the engine on a cargo tank vehicle powering filling of the vertical storage tank. [NFPA 58: 7.2.3.2]
  - b. Electrical equipment and lights unless designed and installed for electrically classified areas. [NFPA 58: 6.23.2.2]
3. Minimum 25 ft. from the point of transfer to:
  - a. Building with wall of less than 1 hour fire resistant rating (i.e. wood buildings) [NFPA 58: Table 6.5.2.1 (B)]
  - b. Buildings with openings below the level of the point of transfer. [NFPA 58: Table 6.5.2.1 (C)]
  - c. Line of adjoining property that can be built upon. [NFPA 58: Table 6.5.2.1 (D)]
  - d. Mainline railroad track centerlines. [NFPA 58: Table 6.5.2.1 (H)] buildings and the line of adjoining property that can be built upon. [NFPA 58: 6.3.1.1]
  - e. Buildings and the line of adjoining property that can be built upon. [NFPA 58: 6.3.1.1]
  - f. Smoking, open flame, portable electrical tools, and extension cords during propane transfer operations. [NFPA 58: 7.2.3.2 (B)]
4. Minimum 50 ft. from all points of transfer to outdoor places of public assembly (i.e. schoolyards, athletic fields, playgrounds). [NFPA 58: Table 6.5.2.1 (E)]



THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TLEMOFF ENGINEERING. ANY REPRODUCTION IS PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF TLEMOFF ENGINEERING IS PROHIBITED.		ALL WORK TO BE PERFORMED IN ACCORDANCE WITH NFPA 58 2014 EDITION		TLEMOFF Engineering Naples, Florida Tlemoffengineering@gmail.com 617 308-0159	
DO NOT SCALE DRAWING		STANDARD LAYOUT FOR UHAUL VERTICAL PROPANE SITE INSTALLATION			
REV	DESCRIPTION	DATE	BY	ENG	
0	ISSUE FOR REVIEW	8/23/15	CH	TL	
1	ISSUE FOR REVIEW	8/23/15	CH	TL	
2	ISSUE FOR REVIEW	8/23/15	CH	TL	
3	ISSUE FOR CLIENT APPROVAL	8/26/15	CH	TL	
DWG #: TLE 151 SHEET 1 OF 1					



A. ASME Vertical Container Notes:

1. The vertical propane storage container foundation to be designed to resist wind and seismic forces at the location. [NFPA 58:6.6.4.1] Foundation design is covered in other documents to be provided by Uhaul.
2. The vertical propane container must be at least 6 ft. from the vertical plane beneath overhead electric power lines that are over 600 volts, nominal. [NFPA58: 6.4.4.13]
3. Bobtails filling the ASME vertical container must be at least 10 ft. from the vertical ASME container. [NFPA 58:7.2.3.3]
4. When the vertical ASME container is being filled, all internal combustion engines on vehicles (other than the engine powering the filling) must be turned off within 15 ft. of the vertical container. [NFPA 58:7.2.3.2 (A)]
5. All parts of the propane storage and dispensing system must be at least 25 ft. from pits. [NFPA 58: 6.2.5.2.2]
6. Install galvanized metal lath and 3/8" Pyrocrete to vertical tank legs per tank installation instructions to provide a 2 hour fire resistance rating to the tank supports. [NFPA 58: 5.2.7.1 (B)]

B. Dispensing Notes:

1. Filling propane cylinders and propane vehicle fuel containers to be conducted only by trained employees. [NFPA 58: 7.2.1.1]
2. Trained employees to remain in attendance during all propane transfer operations. [NFPA 58: 7.2.1.2]
3. Cylinders, other than engine fuel cylinders, older than 12 years from the date of manufacture or 5 or 12 years from recertification (marked on the cylinder) via the visual or hydrostatic recertification method cannot be filled until recertified. (Not applicable to ASME containers installed on vehicles.) [NFPA 58: 5.2.2.2]
4. Only cylinders fabricated to U. S. Department of Transportation and the ASME Boiler and Pressure Vessel Code Section VIII can be filled with propane. [NFPA 58: 5.2.1.1]
5. Minimum 15 ft. from the point of transfer to areas where cell phones, electrical equipment, and other sources of ignition are used during propane transfer. [NFPA 58: 6.23.2.2]
6. Minimum 35 ft. from the points of transfer to metal cutting, grinding, oxygen-fuel cutting, brazing, soldering, or welding during propane transfer operations. [NFPA 58: 7.2.3.2 (C)]
7. Dispensing systems must be secured when dispensing service is not offered. [NFPA 58: 6.25.3.7]
8. A station to stop the LP-Gas pump must be located at the pump. [NFPA 58: 6.25.3.4]
9. Locate the actuator for the emergency shutoff valve within 3 ft. of each point of transfer. [NFPA 58: 6.25.3.9]
10. An emergency stop switch must be located between 20 ft. and 100 ft. from the points of transfer and dispensing cabinet and identified with signs visible from the points of transfer. [NFPA 58: 6.25.3.17]

C. Drawing Notes:

1. Minimum 10 ft. from the points of transfer to:
  - a. Buildings with a 1 hour or greater fire rated walls (i.e. wood buildings and building walls with windows). [NFPA 58: Table 6.5.2.1 (A)]
  - b. Public ways, including public streets, highways, thoroughfares and sidewalks. [NFPA 58: Table 6.5.2.1 (F) (1)]
  - c. LP-Gas containers other than those being filled or waiting to be filled. [NFPA 58: Table 6.5.2.1 (I)]. (Does not apply to the vertical propane storage container at the Uhaul site.)
2. Minimum of 15 ft. from the points of transfer to:
  - a. Internal combustion engines during transfer of propane, other than the engine on a cargo tank vehicle powering filling of the vertical storage tank. [NFPA 58: 7.2.3.2]
  - b. Electrical equipment and lights unless designed and installed for electrically classified areas. [NFPA 58: 6.23.2.2]
3. Minimum 25 ft. from the point of transfer to:
  - a. Building with wall of less than 1 hour fire resistant rating (i.e. wood buildings) [NFPA 58: Table 6.5.2.1 (B)]
  - b. Buildings with openings below the level of the point of transfer. [NFPA 58: Table 6.5.2.1 (C)]
  - c. Line of adjoining property that can be built upon. [NFPA 58: Table 6.5.2.1(D)]
  - d. Mainline railroad track centerlines. [NFPA 58: Table 6.5.2.1 (H)] buildings and the line of adjoining property that can be built upon. [NFPA 58: 6.3.1.1]
  - e. Buildings and the line of adjoining property that can be built upon. [NFPA 58: 6.3.1.1]
  - f. Smoking, open flame, portable electrical tools, and extension cords during propane transfer operations. [NFPA 58: 7.2.3.2 (B)]
4. Minimum 50 ft. from all points of transfer to outdoor places of public assembly (i.e. schoolyards, athletic fields, playgrounds). [NFPA 58: Table 6.5.2.1 (E)]



THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TLEMOFF ENGINEERING. ANY REPRODUCTION IS PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF TLEMOFF ENGINEERING IS PROHIBITED.	ALL WORK TO BE PERFORMED IN ACCORDANCE WITH NFPA 58 2014 EDITION	TLemoff Engineering Naples, Florida Tlemoffengineering@gmail.com 617 308-0159																									
DO NOT SCALE DRAWING	STANDARD LAYOUT FOR UHAUL VERTICAL PROPANE SITE INSTALLATION	DWG #: TLE 151																									
<table border="1"> <thead> <tr> <th>REV.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>DRW</th> <th>ENG</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>ISSUE FOR REVIEW</td> <td>7/24/15</td> <td>CR</td> <td>TL</td> </tr> <tr> <td>1</td> <td>ISSUE FOR REVIEW</td> <td>7/27/15</td> <td>CR</td> <td>TL</td> </tr> <tr> <td>2</td> <td>ISSUE FOR REVIEW</td> <td>8/2/15</td> <td>CR</td> <td>TL</td> </tr> <tr> <td>3</td> <td>ISSUE FOR CLIENT APPROVAL</td> <td>8/26/15</td> <td>CR</td> <td>TL</td> </tr> </tbody> </table>	REV.	DESCRIPTION	DATE	DRW	ENG	0	ISSUE FOR REVIEW	7/24/15	CR	TL	1	ISSUE FOR REVIEW	7/27/15	CR	TL	2	ISSUE FOR REVIEW	8/2/15	CR	TL	3	ISSUE FOR CLIENT APPROVAL	8/26/15	CR	TL	SHEET 1 OF 1	RE
REV.	DESCRIPTION	DATE	DRW	ENG																							
0	ISSUE FOR REVIEW	7/24/15	CR	TL																							
1	ISSUE FOR REVIEW	7/27/15	CR	TL																							
2	ISSUE FOR REVIEW	8/2/15	CR	TL																							
3	ISSUE FOR CLIENT APPROVAL	8/26/15	CR	TL																							



## DOT Cylinder Refilling

DOT Cylinders can be refilled

Do not fill:

- Canadian cylinders (marked TC - Transport Canada). (They can be used.)
- Cylinders that are out of date:  
New cylinders can be filled for 12 years from the date of manufacture (usually stamped into the collar)

Cylinders that have been re-qualified can be filled for the following periods:

Requalification Method	Identification Date (month - year)	Refill allowed for:
<b>Visual</b>	12-20	5 years
<b>Proof Pressure</b>	12-20 S	7 years
<b>Volumetric Expansion</b>	12-20 E	12 years



This applies only to refilling, not use from cylinders.

**Cylinders with any of the following should not be filled.**

Offer to sell the customer a new cylinder or refer them to a location that requalifies cylinders. (Note that it may cost more to requalify a 20 lb. cylinder than to purchase a new one.)



Dented Cylinder



Fire Damaged, bulged Cylinder



Excessive Corrosion

Also, do not fill cylinders that lean, cylinders with welded attachments, and gouged cylinders

A. ASME Vertical Container Notes:

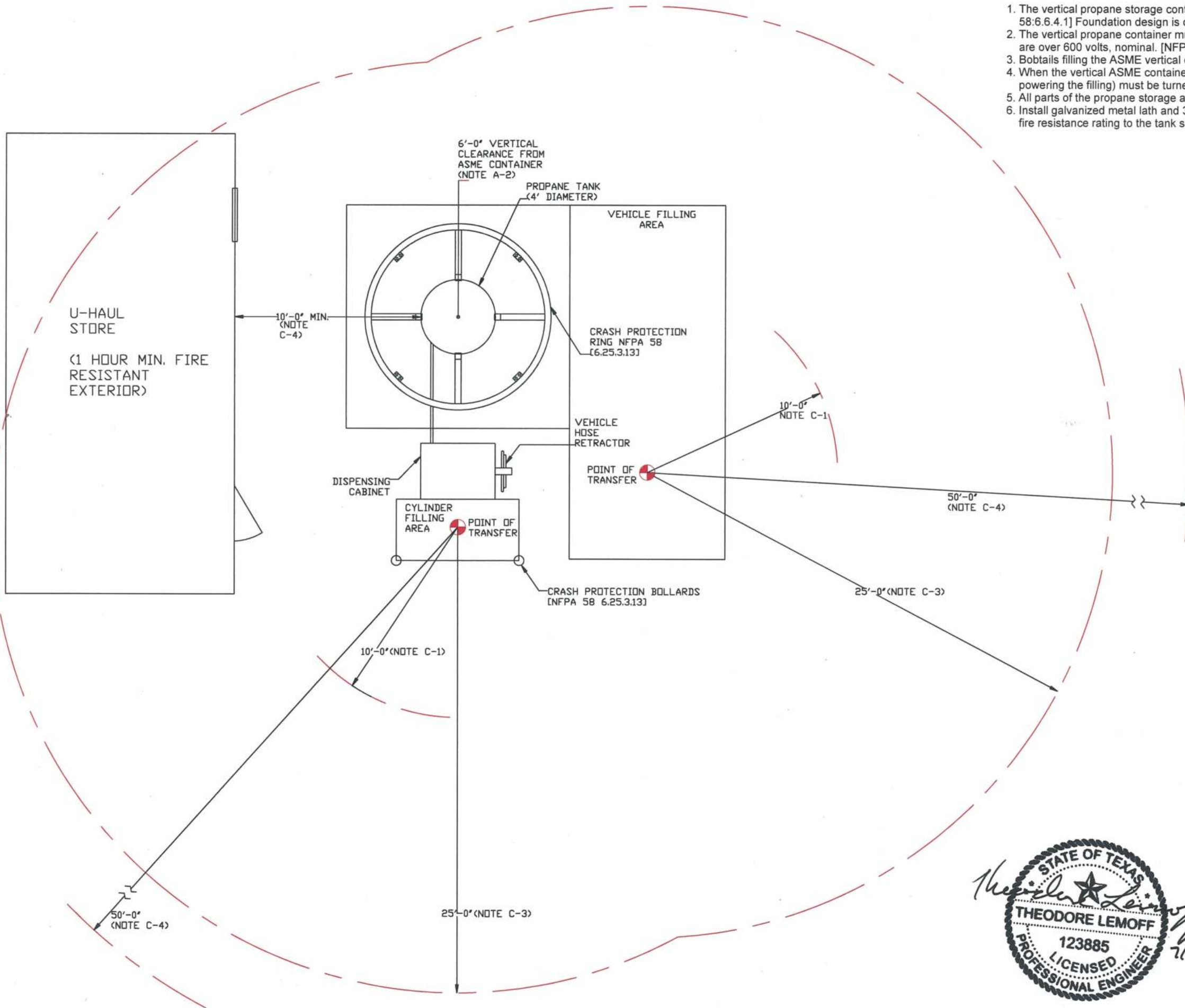
1. The vertical propane storage container foundation to be designed to resist wind and seismic forces at the location. [NFPA 58:6.6.4.1] Foundation design is covered in other documents to be provided by Uhaul.
2. The vertical propane container must be at least 6 ft. from the vertical plane beneath overhead electric power lines that are over 600 volts, nominal. [NFPA58: 6.4.4.13]
3. Bobtails filling the ASME vertical container must be at least 10 ft. from the vertical ASME container. [NFPA 58:7.2.3.3]
4. When the vertical ASME container is being filled, all internal combustion engines on vehicles (other than the engine powering the filling) must be turned off within 15 ft. of the vertical container. [NFPA 58:7.2.3.2 (A)]
5. All parts of the propane storage and dispensing system must be at least 25 ft. from pits. [NFPA 58: 6.25.2.2]
6. Install galvanized metal lath and 3/8" Pyrocrete to vertical tank legs per tank installation instructions to provide a 2 hour fire resistance rating to the tank supports. [NFPA 58: 5.2.7.1 (B)]

B. Dispensing Notes:

1. Filling propane cylinders and propane vehicle fuel containers to be conducted only by trained employees. [NFPA 58: 7.2.1.1]
2. Trained employees to remain in attendance during all propane transfer operations. [NFPA 58: 7.2.1.2]
3. Cylinders, other than engine fuel cylinders, older than 12 years from the date of manufacture or 5 or 12 years from recertification (marked on the cylinder) via the visual or hydrostatic recertification method cannot be filled until recertified. (Not applicable to ASME containers installed on vehicles.) [NFPA 58: 5.2.2.2]
4. Only cylinders fabricated to U. S. Department of Transportation and the ASME Boiler and Pressure Vessel Code Section VIII can be filled with propane. [NFPA 58: 5.2.1.1]
5. Minimum 15 ft. from the point of transfer to areas where cell phones, electrical equipment, and other sources of ignition are used during propane transfer. [NFPA 58: 6.23.2.2]
6. Minimum 35 ft. from the points of transfer to metal cutting, grinding, oxygen-fuel cutting, brazing, soldering, or welding during propane transfer operations. [NFPA 58: 7.2.3.2 (C)]
7. Dispensing systems must be secured when dispensing service is not offered. [NFPA 58: 6.25.3.7]
8. A station to stop the LP-Gas pump must be located at the pump. [NFPA 58: 6.25.3.4]
9. Locate the actuator for the emergency shutoff valve within 3 ft. of each point of transfer. [NFPA 58: 6.25.3.9]
10. An emergency stop switch must be located between 20 ft. and 100 ft. from the points of transfer and dispensing cabinet and identified with signs visible from the points of transfer. [NFPA 58: 6.25.3.17]

C. Drawing Notes:

1. Minimum 10 ft. from the points of transfer to:
  - a. Buildings with a 1 hour or greater fire rated walls (i.e. wood buildings and building walls with windows). [NFPA 58: Table 6.5.2.1 (A)]
  - b. Public ways, including public streets, highways, thoroughfares and sidewalks. [NFPA 58: Table 6.5.2.1 (F) (1)]
  - c. LP-Gas containers other than those being filled or waiting to be filled. [NFPA 58: Table 6.5.2.1 (I)]. (Does not apply to the vertical propane storage container at the Uhaul site.)
2. Minimum of 15 ft. from the points of transfer to:
  - a. Internal combustion engines during transfer of propane, other than the engine on a cargo tank vehicle powering filling of the vertical storage tank. [NFPA 58: 7.2.3.2]
  - b. Electrical equipment and lights unless designed and installed for electrically classified areas. [NFPA 58: 6.23.2.2]
3. Minimum 25 ft. from the point of transfer to:
  - a. Building with wall of less than 1 hour fire resistant rating (i.e. wood buildings) [NFPA 58: Table 6.5.2.1 (B)]
  - b. Buildings with openings below the level of the point of transfer. [NFPA 58: Table 6.5.2.1 (C)]
  - c. Line of adjoining property that can be built upon. [NFPA 58: Table 6.5.2.1(D)]
  - d. Mainline railroad track centerlines. [NFPA 58: Table 6.5.2.1 (H)] buildings and the line of adjoining property that can be built upon. [NFPA 58: 6.3.1.1]
  - e. Buildings and the line of adjoining property that can be built upon. [NFPA 58: 6.3.1.1]
  - f. Smoking, open flame, portable electrical tools, and extension cords during propane transfer operations. [NFPA 58: 7.2.3.2 (B)]
4. Minimum 50 ft. from all points of transfer to outdoor places of public assembly (i.e. schoolyards, athletic fields, playgrounds). [NFPA 58: Table 6.5.2.1 (E)]



THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TLEMOFF ENGINEERING. ANY REPRODUCTION IS PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF TLEMOFF ENGINEERING IS PROHIBITED.		ALL WORK TO BE PERFORMED IN ACCORDANCE WITH NFPA 58 2014 EDITION	TLemoff Engineering Naples, Florida Tlenoffengineering@gmail.com 617 308-0159
REV. / DESCRIPTION		DATE	REV. / ENG.
1	ISSUED FOR REVIEW	07/25/16	TLE / TLE
2	ISSUED FOR REVIEW	07/25/16	TLE / TLE
3	ISSUED FOR CLIENT APPROVAL	07/25/16	TLE / TLE

DO NOT SCALE DRAWING

UHAUL VERTICAL PROPANE TANK SITE INSTALLATION LAYOUT

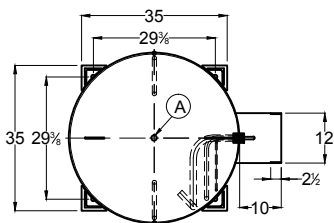
DWG #: TLE 151

SHEET 1 OF 1

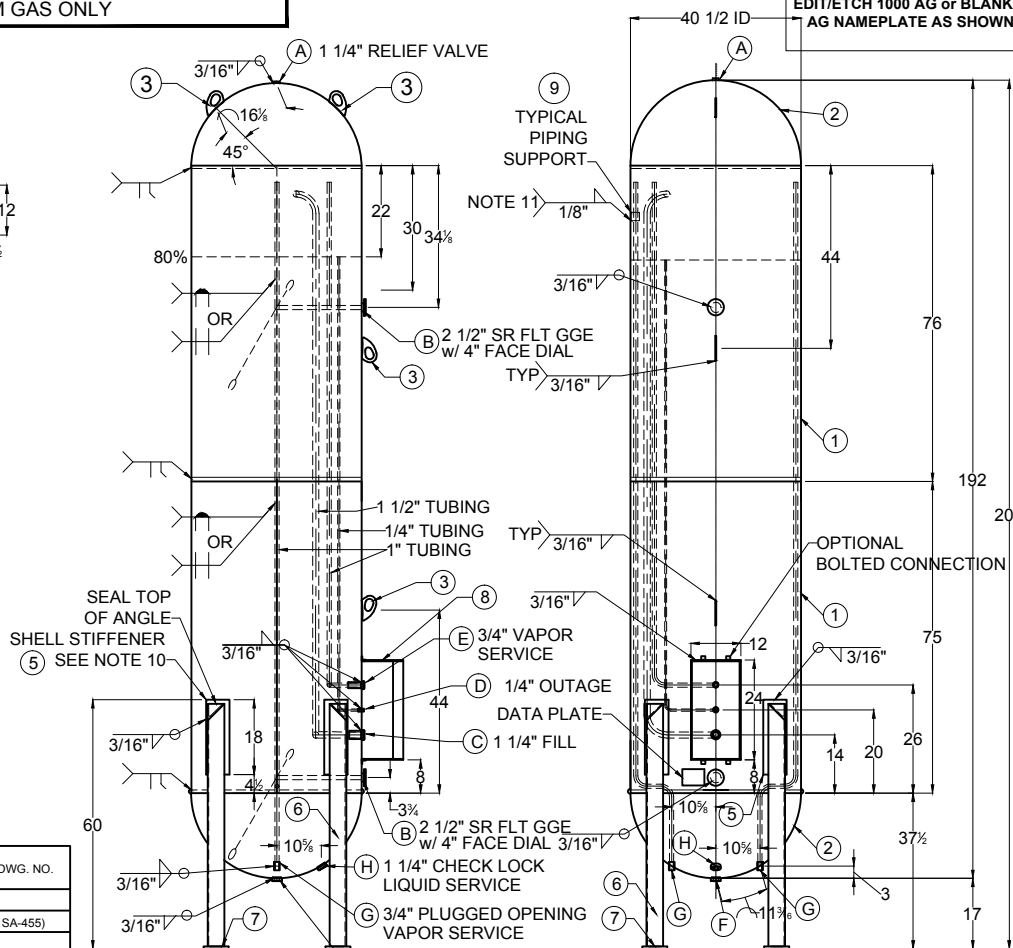
# TANK



THIS VESSEL IS DESIGNED FOR THE STORAGE OF LIQUEFIED PETROLEUM GAS ONLY

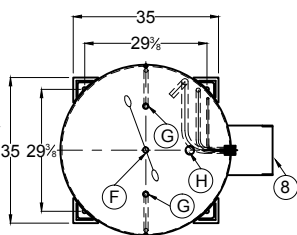


TOP VIEW

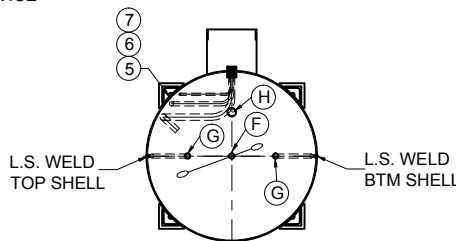


SIDE VIEW

FRONT VIEW



BOTTOM VIEW



BOTTOM VIEW

EDIT/ETCH 1000 AG or BLANK AG NAMEPLATE AS SHOWN

**CERTIFIED BY: QUALITY STEEL CORPORATION**  
 CLEVELAND, MS - FREMONT, OH - WEST JORDAN, UT

MAX. ALLOW. WORK. PRESS. **250 PSI** AT **400** ° F.  
 M.D.M.T. **-20** ° F. AT **250** PSI

YEAR BUILT **2011** SER. NO. **U**

LENGTH **192** IN. OUTSIDE DIA. **41** IN.  
 HEAD THK. **0.205** IN. SHELL THK. **0.242** IN.  
 ABOVE GROUND TYPE **DISP** SURFACE AREA **172** SQ. FT.  
 HEAD D.R. **HEMI.** WATER CAPACITY **1000** GALLONS

THIS CONTAINER SHALL NOT CONTAIN A PRODUCT HAVING A VAPOR PRESSURE IN EXCESS OF 215 PSI AT 100°F.  
 DIP TUBE **80% FULL AT 40°F**

DATA PLATE DETAIL

- GENERAL NOTES:**
1. A SINGLE STAMPED LIFTING LUG IS DESIGNED FOR A TOTAL LIFTING WEIGHT OF 7,795#.
  2. TOTAL EMPTY WEIGHT IS 2330# WITH 0.272 PLATE
  3. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
  4. COMPLETE TANK DRIED TO REMOVE ALL MOISTURE
  5. EXTERIOR OF TANK TO BE GRIT BLASTED.
  6. PAINT PER SHOP ORDER
  7. VACUUM PURGE TANK.
  8. DIMENSIONS ARE SUBJECT TO CHANGE WITH OUT NOTICE. (NON-PRESSURE RETAINING COMPONENTS ONLY)
  9. THREADS OF ALL FITTINGS TO BE COATED WITH COMPOUND SUITABLE FOR USE WITH LP GAS.
  10. DO NOT STOP OR START WELD AT CORNER OF PA.
  11. WELD ON INSIDE OF TANK MUST BE INSPECTED
  12. ALL WEIGHT AND CAPACITIES ARE APPROXIMATE

GENERAL SPECIFICATIONS	
WATER CAPACITY (GALLONS)	1000
ALLOWABLE WORKING PRESSURE (PSIG)	250
JOINT EFFICIENCY:	ASME UW-51 LONG SEAM 100 %
	ASME UW-52 HEAD TO SHELL 80 %
HYDROSTATIC TEST PRESSURE (PSIG)	325
SURFACE AREA (SQ. FT.)	172
RELIEF VALVE SETTING (PSIG)	250
RELIEF DISCHARGE RATE - (CFM REQ'D.)	3652
CODE:	ASME SECTION VIII DIV. I
CALC: C17	
HEAT TREATMENT NOT REQUIRED	
MATERIAL SPECS:	
COUPLINGS	SA-105 (3,000#)
TANK FLANGES	SA-105 or SA-181-70 (3,000#)
ADAPTOR	SA-105 or SA-181-70

1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS

**QUALITY STEEL CORPORATION**

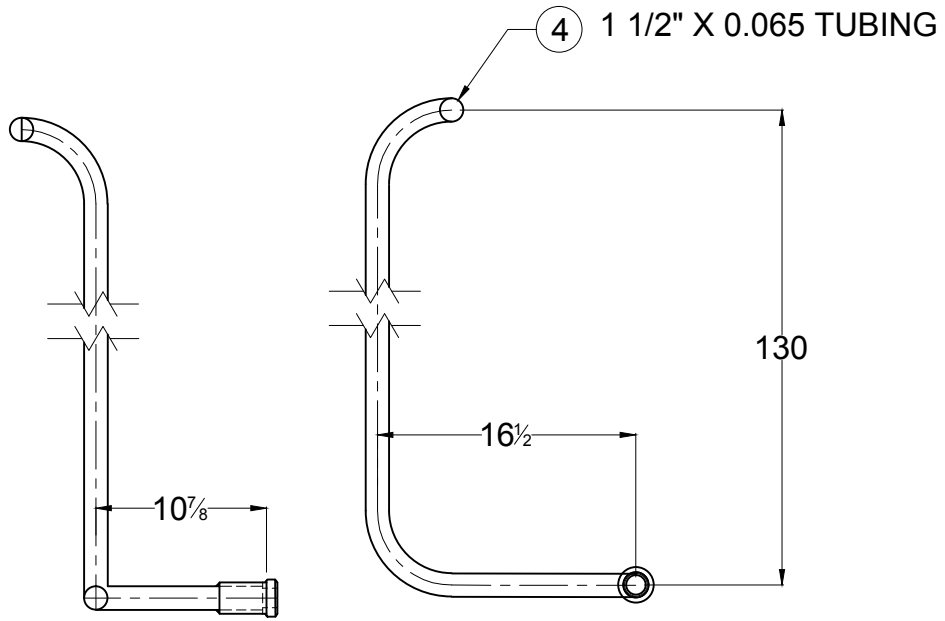
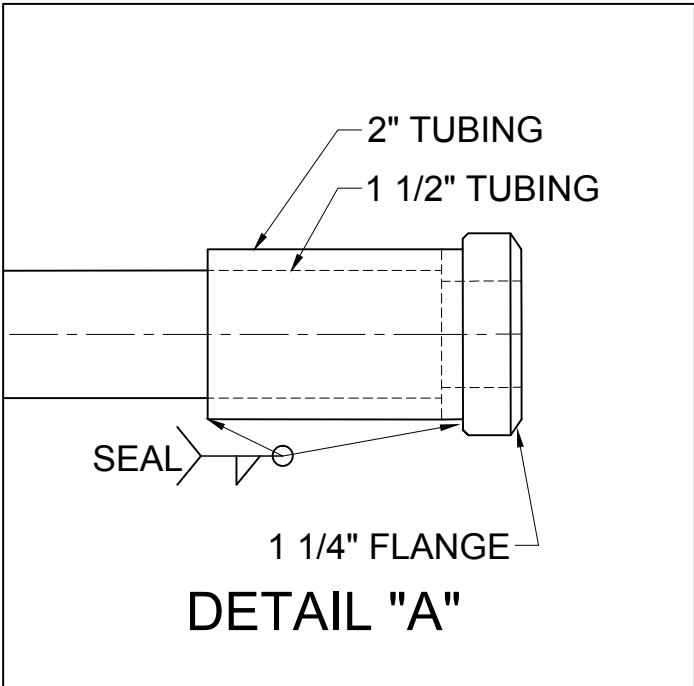
REV.	BY:	DESCRIPTION	DATE:
0	wfo	ORIGINAL ISSUE	05/22/07
1	RGA	REVISED COMPANY NAME	12/08/07
2	wfo	CORRECTED WELD SYMBOLS	08/12/08
3	wfo	CHANGED TO NARROW SHELL	05/29/09
4	wfo	ADDED ADDITION LIFTING LUGS AND OPTION TO BOLT ON PROTECTOR	06/28/11
5	bts	2 PLATE SHELL AND NEW DATA PLATE	10/10/13
6	bts	UPDATE FITTINGS AND PIPING	10/21/13
7	TWV	UPDT NAMEPLATE AND TO NEW STD	07/28/16

MARK	QTY.	DESCRIPTION	DWG. NO.
1	2	SHELL - 0.242" X 76" X 127 3/8" - SA455 or SA414G	
NOTE OPTIONAL SHELL MATERIAL FROM 1450 PLATE (0.272 THK SA-455)			
2	2	HEAD - 40 1/2" I.D. X 0.205" MIN - HEMI: SA414C	
3	4	LIFTING LUG	D - 63
4	1	DATA PLATE	D - 60
5	4	SHELL STIFFENER	VF-1000DET
6	4	LEGS	VF-1000DET
7	4	BASE PLATE	VF-1000DET
8	1	VALVE PROTECTOR	VF-1000DET
9	10	TUBING SUPPORT	VF-1000S

MARK	QTY.	SIZE	TYPE	FITTINGS		SERVICE
				REGO		
A	1	1 1/4	XH FLG.	008685GT		RELIEF VALVE
B	2	2 1/2	SR ADAP	SQUIBB-TAYLOR - SD140A SR FG 41" END MT. - WITH 4" FACE DIAL ADDED		FLOAT GAUGE
C	1	1 1/4	FULL COUPLING w/ 1 1/2" TUBING (SEE VF-1000C)	L007579T		FILL VALVE
D	1	1/4	FULL COUPLING w/ 1/2" TUBING (SEE VF-1000D)	003165DPT		OUTGAGE VALVE
E	1	3/4	FULL COUPLING w/ 1" TUBING (SEE VF-1000E)	PT009102R1T		SERVICE VALVE
F	1	1 1/4	XH FLG.			PLUGGED OPENING
G	2	3/4	FULL COUPLING w/ 1" TUBING (SEE VF-1000G)			PLUGGED OPENING
H	1	1 1/4	XH FLG.	007591UT		CHEK LOK

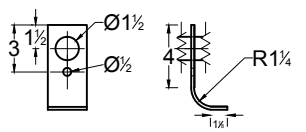
PART NO: 0110909X

DATE	DRAWN BY:	APPROVED BY:	REVISION:	DRAWING NO.:
05/22/07	wfo	TWV	7	VF-1000

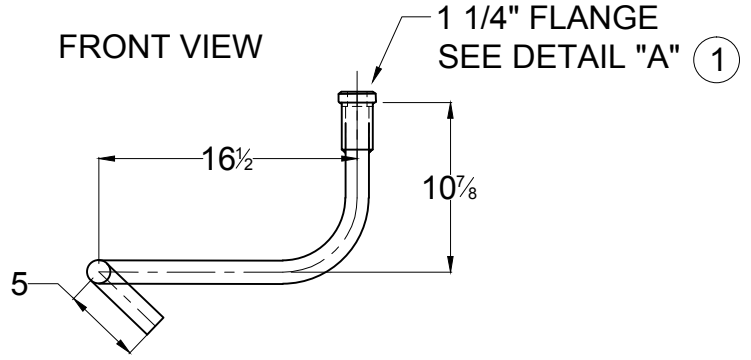


SIDE VIEW

FRONT VIEW



SUPPORT BRACKET (x 5)  
DETAIL



BOTTOM VIEW

③ 1 1/4" FILL VALVE WITH 1 1/2" TUBING  
1 EACH (166" OF TUBING)

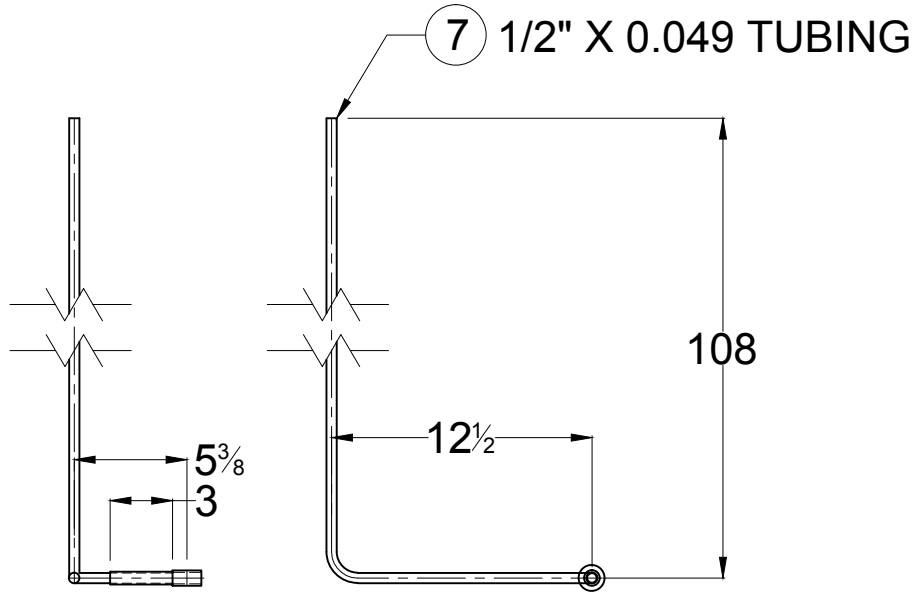
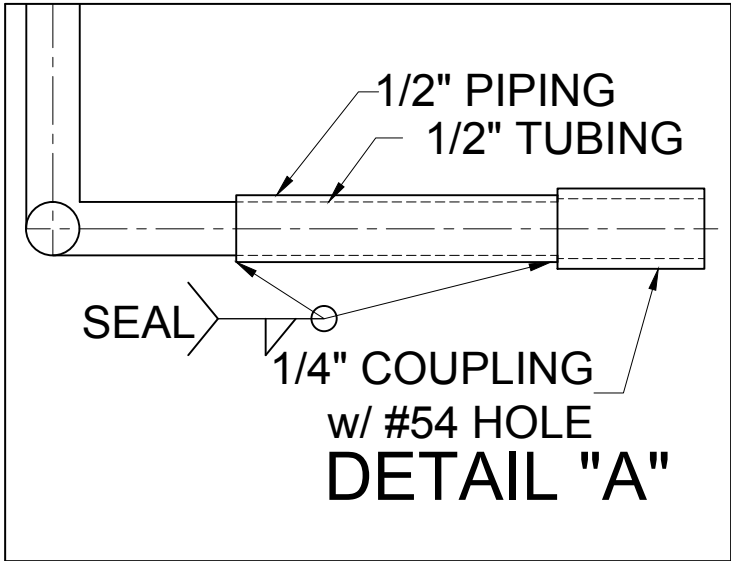
NOTE: SEE  
TANK DRAWING  
FOR REVISION  
BLOCK

MARK	QTY.	DESCRIPTION
1	1	1 1/4" XH FLANGE (SA-105)
2	1	1/4" COUPLING w/ #54 HOLE (SA-105)
3	3	3/4" XH FLANGE (SA-105)
4	1	1 1/2" TUBING X 0.065 X 166 (130" OAL AFTER BENDING)
5	2	1" TUBING X 0.065 X 175 (163" OAL AFTER BENDING)
6	1	1" TUBING X 0.065 X 144 (121" OAL AFTER BENDING)
7	1	1/2" TUBING X 0.049 X 128 (108" OAL AFTER BENDING)
8	10	L 1 1/2" x 1 1/2" x 3/16" (SA-36)
9	2	1/2" EMT ONE HOLE PIPE SUPPORT
10	6	1" EMT ONE HOLE PIPE SUPPORT
11	2	1 1/2" EMT ONE HOLE PIPE SUPPORT

1000 W.G. VERTICAL ABOVEGROUND  
PROPANE TANK-DISPENSER w/LEGS

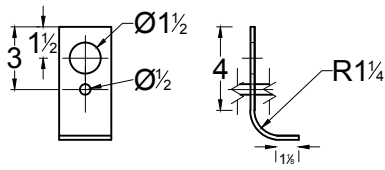
**QUALITY STEEL CORPORATION  
PIPING DETAIL**

DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000
-------------------	------------------	---------------------	----------------	-------------------------

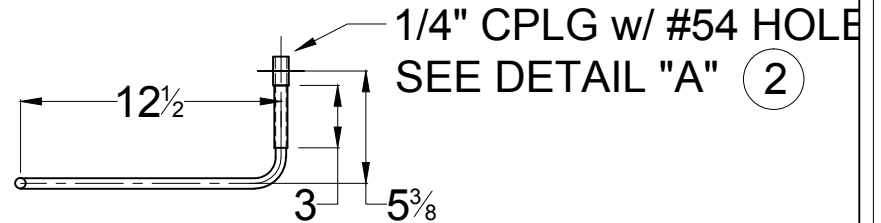


SIDE VIEW

FRONT VIEW



SUPPORT BRACKET (x 5)  
DETAIL



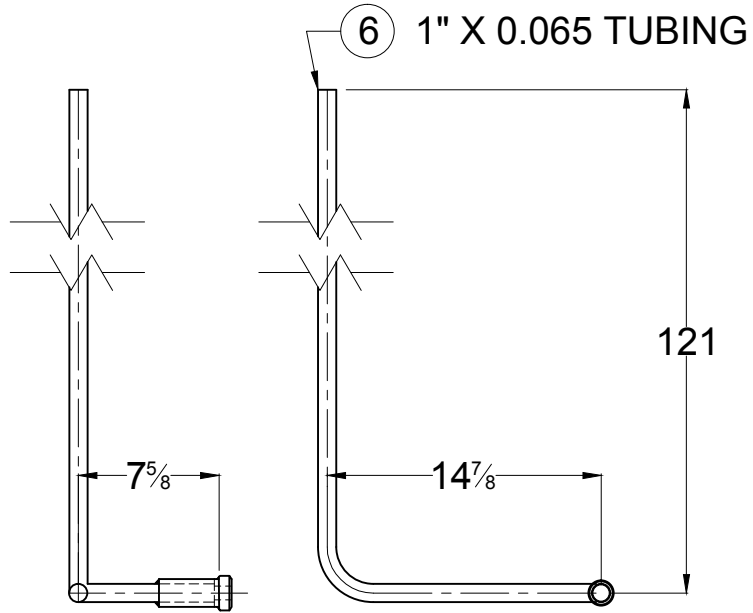
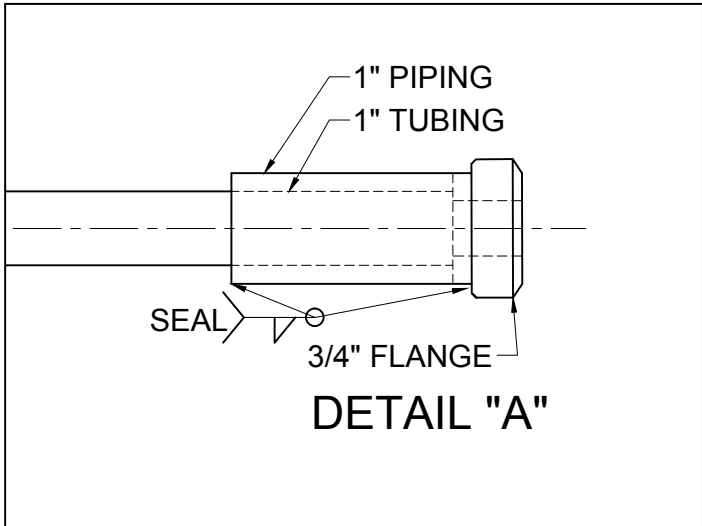
BOTTOM VIEW

**D** 1/4" OUTGAGE WITH 1/2" TUBING  
1 EACH (128" OF TUBING)

NOTE: SEE  
TANK DRAWING  
FOR REVISION  
BLOCK

MARK	QTY.	DESCRIPTION
1	1	1 1/4" XH FLANGE (SA-105)
2	1	1/4" COUPLING w/ #54 HOLE (SA-105)
3	3	3/4" XH FLANGE (SA-105)
4	1	1 1/2" TUBING X 0.065 X 166 (130" OAL AFTER BENDING)
5	2	1" TUBING X 0.065 X 175 (163" OAL AFTER BENDING)
6	1	1" TUBING X 0.065 X 144 (121" OAL AFTER BENDING)
7	1	1/2" TUBING X 0.049 X 128 (108" OAL AFTER BENDING)
8	10	L 1 1/2" x 1 1/2" x 3/16" (SA-36)
9	2	1/2" EMT ONE HOLE PIPE SUPPORT
10	6	1" EMT ONE HOLE PIPE SUPPORT
11	2	1 1/2" EMT ONE HOLE PIPE SUPPORT

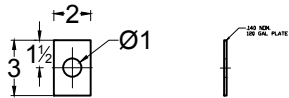
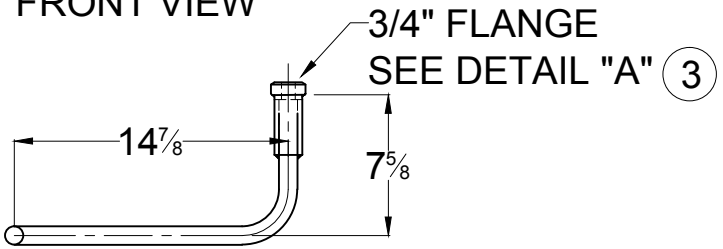
1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS			
<b>QUALITY STEEL CORPORATION PIPING DETAIL</b>			
DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7
			DRAWING No.: VF-1000



SIDE VIEW

FRONT VIEW

BOTTOM VIEW



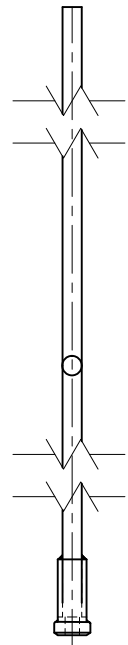
SUPPORT BRACKET (x 4)  
DETAIL

**E** 3/4" VAPOR SERVICE WITH 1" TUBING  
1 EACH (144" OF TUBING)

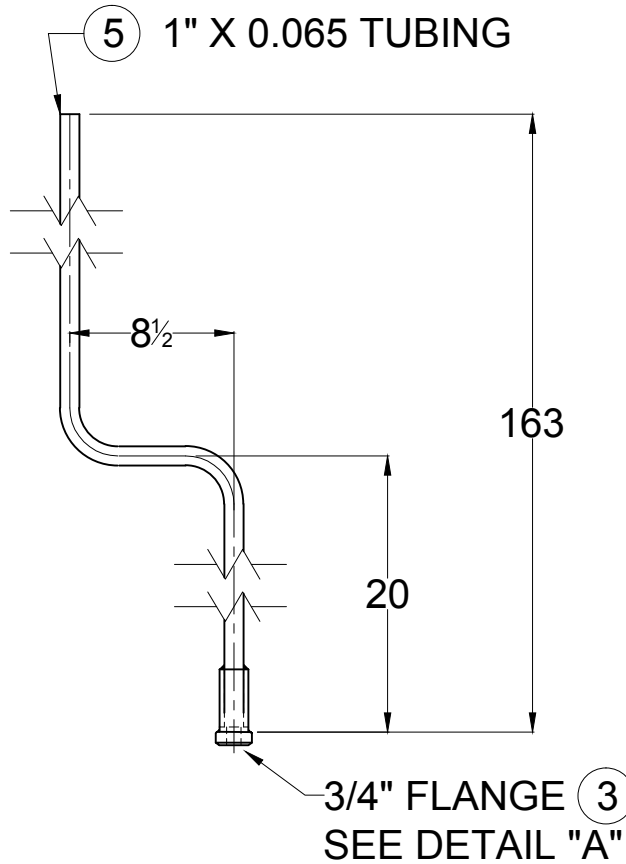
NOTE: SEE  
TANK DRAWING  
FOR REVISION  
BLOCK

MARK	QTY.	DESCRIPTION
1	1	1 1/4" XH FLANGE (SA-105)
2	1	1/4" COUPLING w/ #54 HOLE (SA-105)
3	3	3/4" XH FLANGE (SA-105)
4	1	1 1/2" TUBING X 0.065 X 166 (130" OAL AFTER BENDING)
5	2	1" TUBING X 0.065 X 175 (163" OAL AFTER BENDING)
6	1	1" TUBING X 0.065 X 144 (121" OAL AFTER BENDING)
7	1	1/2" TUBING X 0.049 X 128 (108" OAL AFTER BENDING)
8	10	L 1 1/2" x 1 1/2" x 3/16" (SA-36)
9	2	1/2" EMT ONE HOLE PIPE SUPPORT
10	6	1" EMT ONE HOLE PIPE SUPPORT
11	2	1 1/2" EMT ONE HOLE PIPE SUPPORT

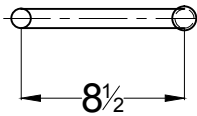
1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS			
<b>QUALITY STEEL CORPORATION PIPING DETAIL</b>			
DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7
			DRAWING No.: VF-1000



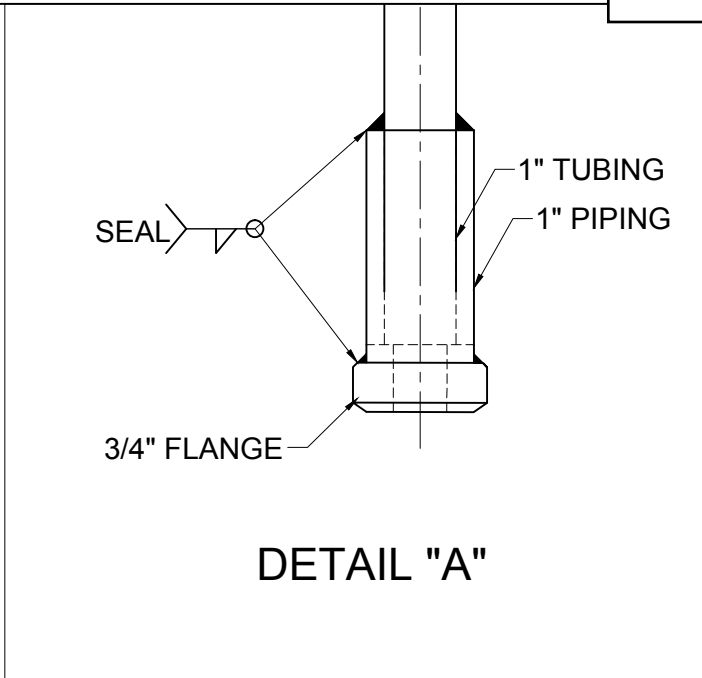
SIDE VIEW



FRONT VIEW



BOTTOM VIEW



DETAIL "A"

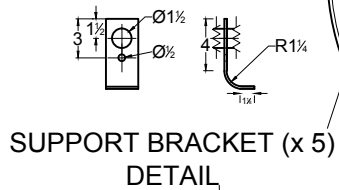
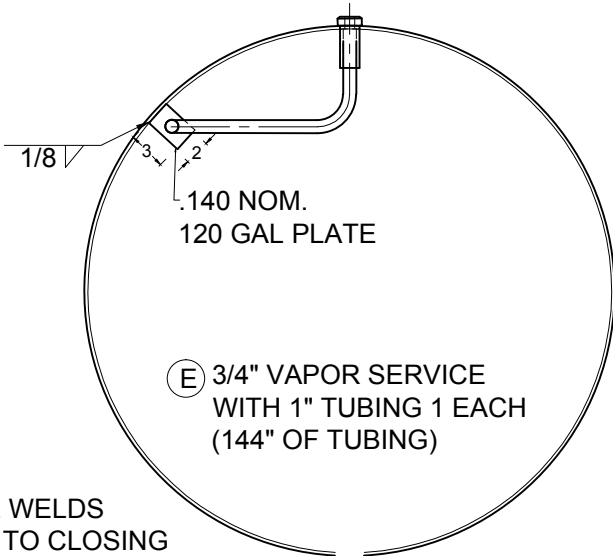
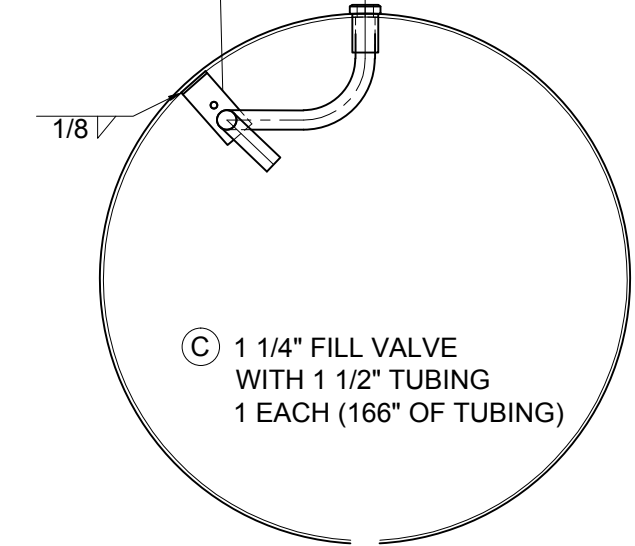
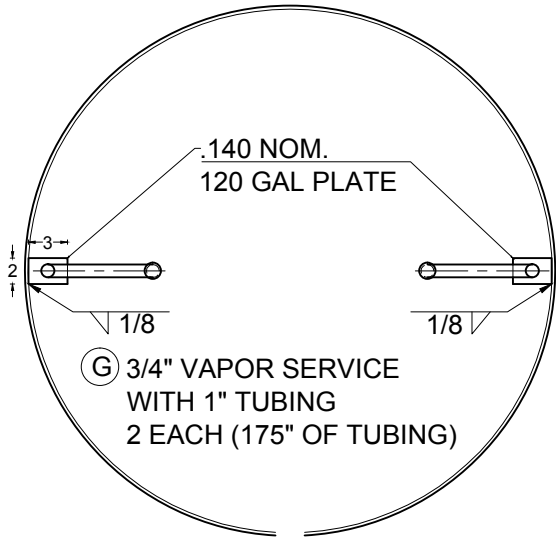
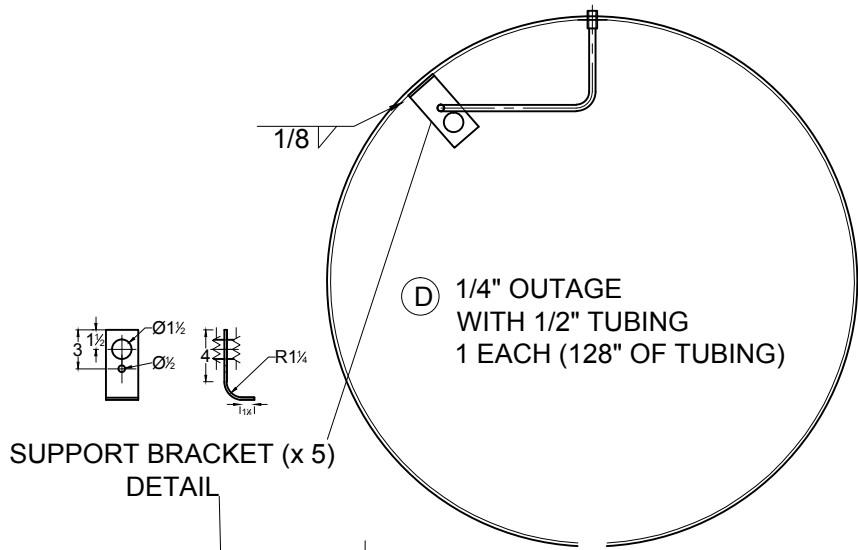
NOTE: SEE TANK DRAWING FOR REVISION BLOCK

**G** 3/4" VAPOR SERVICE WITH 1" TUBING  
2 EACH (175" OF TUBING)

MARK	QTY.	DESCRIPTION
1	1	1 1/4" XH FLANGE (SA-105)
2	1	1/4" COUPLING w/ #54 HOLE (SA-105)
3	3	3/4" XH FLANGE (SA-105)
4	1	1 1/2" TUBING X 0.065 X 166 (130" OAL AFTER BENDING)
5	2	1" TUBING X 0.065 X 175 (163" OAL AFTER BENDING)
6	1	1" TUBING X 0.065 X 144 (121" OAL AFTER BENDING)
7	1	1/2" TUBING X 0.049 X 128 (108" OAL AFTER BENDING)
8	10	L 1 1/2" x 1 1/2" x 3/16" (SA-36)
9	2	1/2" EMT ONE HOLE PIPE SUPPORT
10	6	1" EMT ONE HOLE PIPE SUPPORT
11	2	1 1/2" EMT ONE HOLE PIPE SUPPORT

1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS				
<b>QUALITY STEEL CORPORATION PIPING DETAIL</b>				
DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000





NOTE: ALL INTERIOR CODE WELDS MUST BE EXAMINED PRIOR TO CLOSING TANK

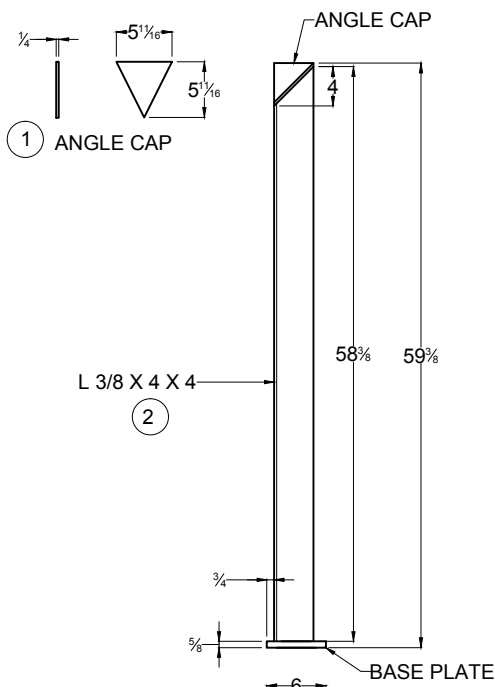
NOTE: SEE TANK DRAWING FOR REVISION BLOCK

MARK	QTY.	DESCRIPTION
1	1	1 1/4" XH FLANGE (SA-105)
2	1	1/4" COUPLING w/ #54 HOLE (SA-105)
3	3	3/4" XH FLANGE (SA-105)
4	1	1 1/2" TUBING X 0.065 X 166 (130" OAL AFTER BENDING)
5	2	1" TUBING X 0.065 X 175 (163" OAL AFTER BENDING)
6	1	1" TUBING X 0.065 X 144 (121" OAL AFTER BENDING)
7	1	1/2" TUBING X 0.049 X 128 (108" OAL AFTER BENDING)
8	10	L 1 1/2" x 1 1/2" x 3/16" (SA-36)
9	2	1/2" EMT ONE HOLE PIPE SUPPORT
10	6	1" EMT ONE HOLE PIPE SUPPORT
11	2	1 1/2" EMT ONE HOLE PIPE SUPPORT

1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS

**QUALITY STEEL CORPORATION**  
**PIPING DETAIL**

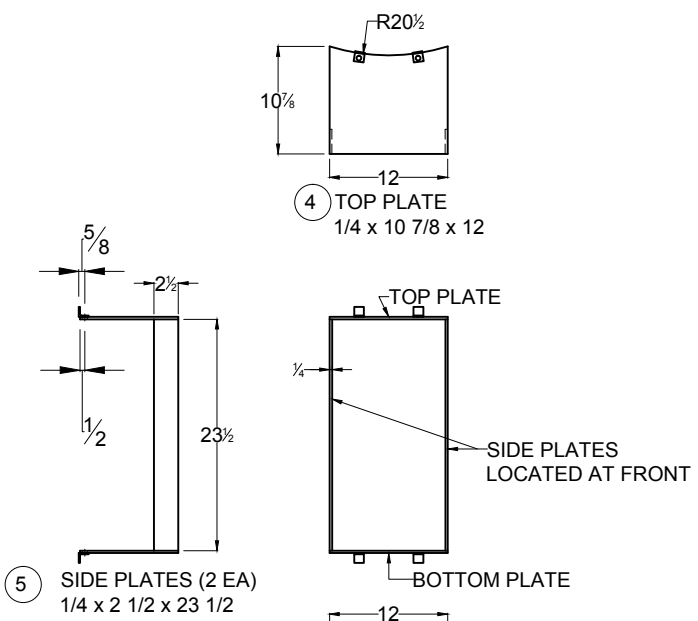
DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000
-------------------	------------------	---------------------	----------------	-------------------------



① ANGLE CAP

② L 3/8 X 4 X 4

③ BASE PLATE  
5/8 x 6 x 6  
  
LEGS  
SA-36  
4 EACH

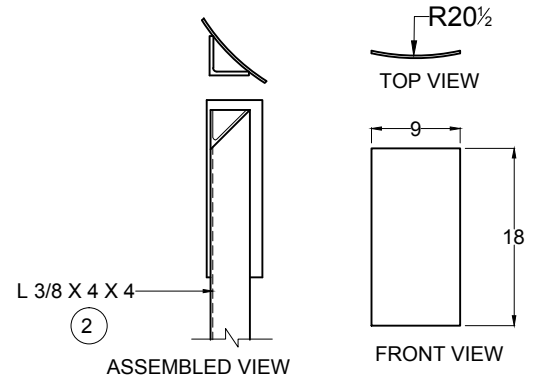


④ TOP PLATE  
1/4 x 10 7/8 x 12

⑤ SIDE PLATES (2 EA)  
1/4 x 2 1/2 x 23 1/2

④ BOTTOM PLATE  
1/4 x 10 7/8 x 12

VALVE PROTECTOR  
SA-36  
1 EACH



② ASSEMBLED VIEW

FRONT VIEW

SHELL STIFFENER  
1/4" MIN THICKNESS  
SA-36 OR SA-455  
4 EACH

OPTIONAL BOLTED CONNECTION  
L 1 x 1 x 1/8 WITH 1/2" HOLE  
BOLT IN PLACE WITH 3/8" BOLT

NOTE: SEE  
TANK DRAWING  
FOR REVISION  
BLOCK

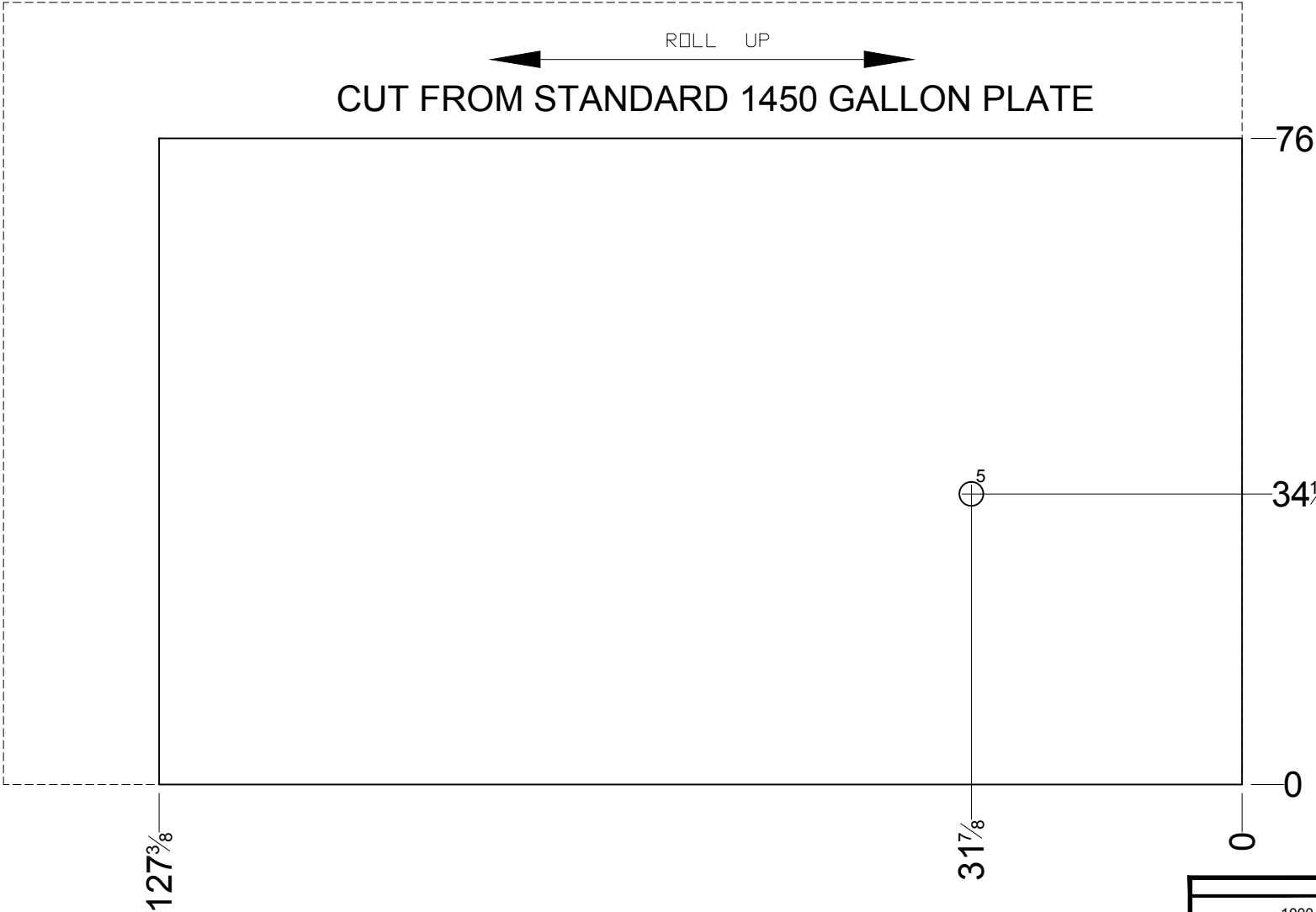
MARK	QTY.	DESCRIPTION
1	4	ANGLE CAPS (1/4 PLATE) SA-36
2	4	ANGLE 3/8 X 4 X 4 X 58 3/8 (SA-36)
3	4	BASE PLATE 5/8 X 6 X 6 (SA-36)
4	2	TOP & BOTTOM PLATE 1/4 X 10 7/8 X 12 (SA-36)
5	2	SIDE PLATE 1/4 X 2 1/2 X 23 1/2 (SA-36)
6	4	SHELL STIFFENER 1/4 MIN X 9 X 18 (SA-36 OR SA-455)

1000 W.G. VERTICAL ABOVEGROUND  
PROPANE TANK-DISPENSER w/LEGS

**QUALITY STEEL CORPORATION**  
**DETAILS**

DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000 - DET
-------------------	------------------	---------------------	----------------	-------------------------------

HOLE SCHEDULE		
HOLE	DIA.	FITTING
1	1 5/8"	3/4"
2	1 3/4"	1"
3	2 1/8"	1 1/4"
4	1"	1/4"
5	2 13/16"	2 1/2"



NOTE: SEE  
TANK DRAWING  
FOR REVISION  
BLOCK

1000 W.G. VERTICAL ABOVEGROUND  
PROPANE TANK-DISPENSER w/LEGS

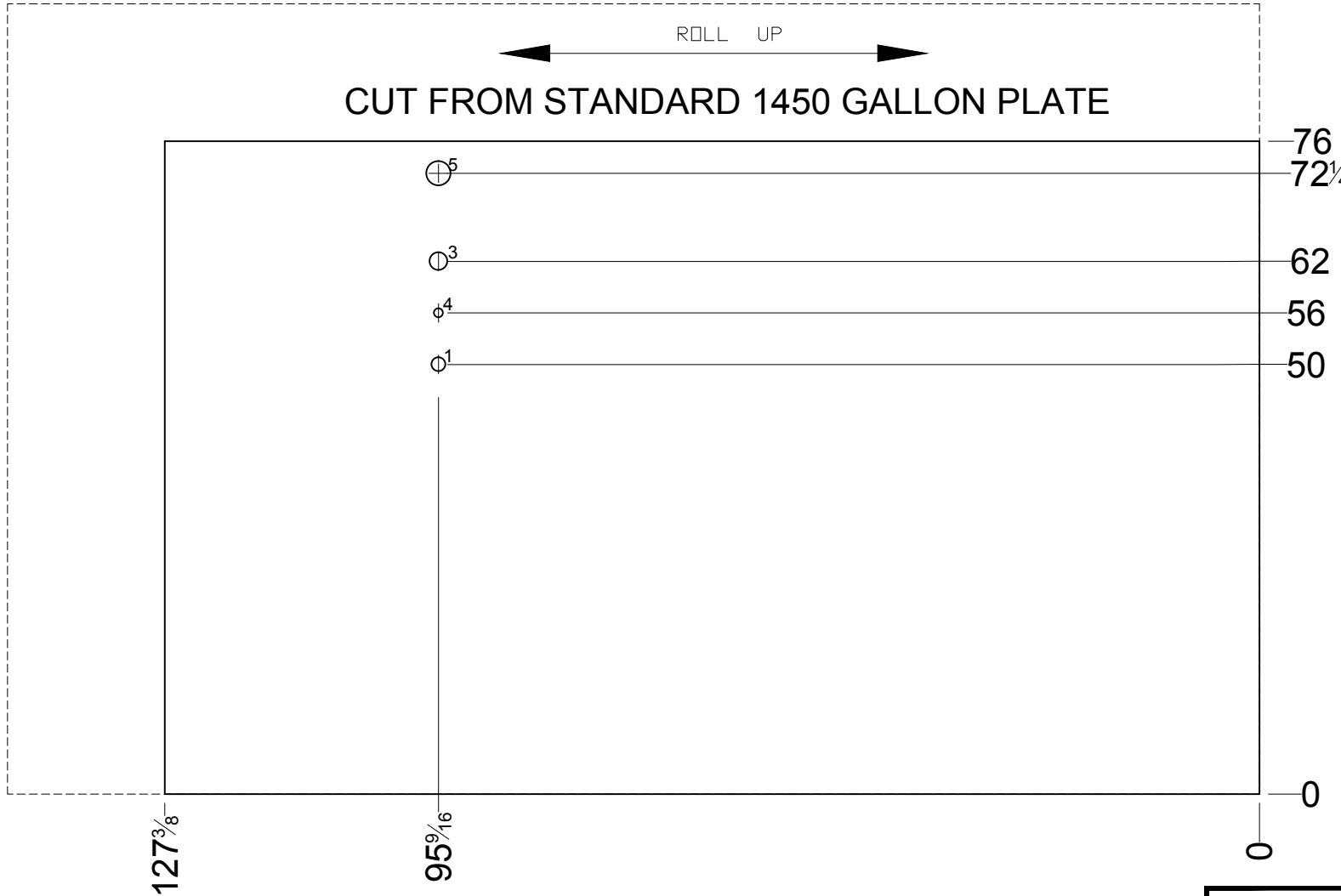
**QUALITY STEEL CORPORATION**  
**TOP FLAT PLATE DETAIL**

DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000
-------------------	------------------	---------------------	----------------	-------------------------

HOLE SCHEDULE		
HOLE	DIA.	FITTING
1	1 5/8"	3/4"
2	1 3/4"	1"
3	2 1/8"	1 1/4"
4	1 1/16"	1/4"
5	2 13/16"	2 1/2"

ROLL UP

CUT FROM STANDARD 1450 GALLON PLATE

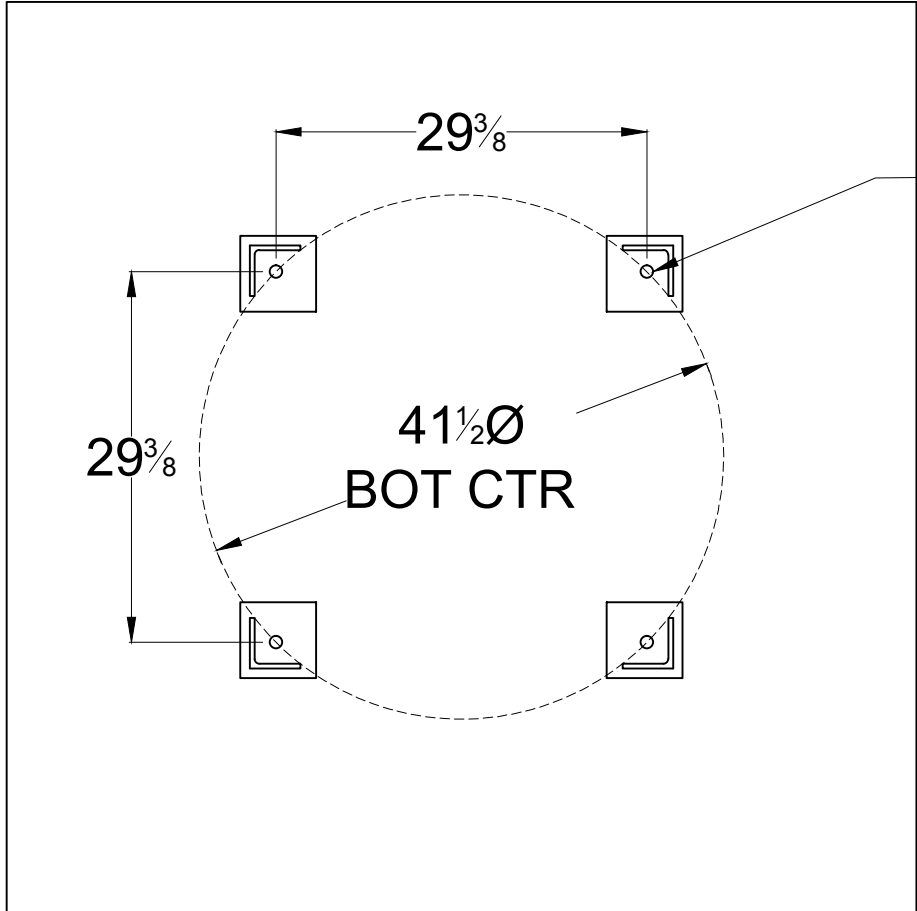


NOTE: SEE TANK DRAWING FOR REVISION BLOCK

1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS

**QUALITY STEEL CORPORATION**  
**BOTTOM FLAT PLATE DETAIL**

DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000
-------------------	------------------	---------------------	----------------	-------------------------



7/8" Ø ANCHOR BOLT  
TYPICAL 4 PLACES

# TOP VIEW

NOTE: SEE  
TANK DRAWING  
FOR REVISION  
BLOCK

1000 W.G. VERTICAL ABOVEGROUND PROPANE TANK-DISPENSER w/LEGS				
<b>QUALITY STEEL CORPORATION</b> <b>ANCHOR BOLT PATTERN</b>				
DATE: 05/22/07	DRAWN BY: wlo	APPROVED BY: TWV	REVISION: 7	DRAWING No.: VF-1000

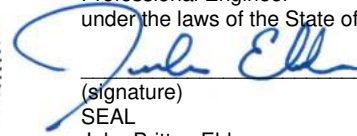
# SAFETY



SAFETY



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

 01/03/2024  
(signature) (date)  
SEAL

John Brittan Elder  
License number #P25413  
My license renewal date is December 31, 2024.  
Pages or sheets covered by this seal:

*Uhaul Propane IA*  
*Structural Calculations*

PROJECT ADDRESS

1100 EAST HICKMAN WAUKEE,  
IA 50263

ISSUE DATE

1/2024

ENGINEER

SS

PROJECT NUMBER

23668

**United Structural Design LLC**

2058 S. Dobson Rd. Ste 10  
Mesa, AZ  
480-454-6408

JOB TITLE Uhaul Propane

2 of 26

Item 3.a.

JOB NO. 23688

SHEET NO. \_\_\_\_\_

CALCULATED BY SS

DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_

DATE \_\_\_\_\_

CS2021 Ver 2023-01-21

[www.struware.com](http://www.struware.com)

**STRUCTURAL CALCULATIONS**

FOR

**Uhaul Propane**



## ASCE 7-16 Seismic Base Shear

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

### DESCRIPTION: Seismic Base Shear Analysis

#### Specific Description: Seismic Forces

#### Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "III" : Buildings and other structures that represent a substantial hazard to human life in the event of a failure. [SCE 7-16, Page 4, Table 1.5-1](#)

Seismic Importance Factor = 1.25 [ASCE 7-16, Page 5, Table 1.5-2](#)

#### Gridded Ss & S1 values from ASCE 7-16

[ASCE 7-16 11.4.2](#)

Max. Ground Motions, 5% Damping

$S_S = 0.06092$  g, 0.2 sec response  
 $S_1 = 0.05083$  g, 1.0 sec response

Location :Waukee, IA 50263

Latitude = 41.602 deg North

Longitude = 93.862 deg West

For the closest datapoint grid location . . .

Latitude = 41.600 deg North

Longitude = 93.860 deg West

#### Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec = **D** (Based on Testing) [ASCE 7-16 Table 20.3-1](#)

Site Coefficients  $F_a$  &  $F_v$   $F_a = 1.60$  [ASCE 7-16 Table 11.4-1 & 11.4-2](#)  
 (using straight-line interpolation from table val)  $F_v = 2.40$

Maximum Considered Earthquake Accelerat  $S_{MS} = F_a * S_s = 0.097$  [ASCE 7-16 Eq. 11.4-1](#)  
 $S_{M1} = F_v * S_1 = 0.122$  [ASCE 7-16 Eq. 11.4-2](#)

Design Spectral Acceleration  $S_{DS} = S_{MS}^{*2/3} = 0.065$  [ASCE 7-16 Eq. 11.4-3](#)  
 $S_{D1} = S_{M1}^{*2/3} = 0.081$  [ASCE 7-16 Eq. 11.4-4](#)

Seismic Design Category = **B** [ISCE 7-16 Table 11.6-1 & -2](#)

#### Resisting System

[ASCE 7-16 Table 12.2-1](#)

Basic Seismic Force Resisting System . . . **Cantilevered column systems detailed to conform to specific classification**

#### 2.Steel ordinary cantilever column systems

Response Modification Coefficient " I " = 1.25 **Building height Limits :**  
 System Overstrength Factor " Wo " = 1.25 Category "A & B" Limit: Limit = 35  
 Deflection Amplification Factor " Cd " = 1.25 Category "C" Limit: Limit = 35  
 Category "D" Limit: Not Permitted ,i  
 Category "E" Limit: Not Permitted ,i  
 Category "F" Limit: Not Permitted ,i

*NOTE! See ASCE 7-16 for all applicable footnc*

#### Lateral Force Procedure

[ASCE 7-16 Section 12.8.2](#)

Equivalent Lateral Force Procedure

[The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8](#)

#### Determine Building Period

[Use ASCE 12.8-7](#)

Structure Type for Building Period CalculzAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest leve 20.0 ft

" x " value = 0.75

" Ta " Approximate fundamental period using Eq. 12.8-7 :  $T_a = Ct * (hn \wedge x) = 0.189$  sec

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 8.000 sec

Building Period " Ta " Calculated from Approximate Method sel= 0.189

#### " Cs " Response Coefficient

[ASCE 7-16 Section 12.8.1.1](#)

$S_{DS}$  : Short Period Design Spectral Response = 0.065 From Eq. 12.8-2, Preliminary Cs = 0.065

" R " : Response Modification Factor = 1.25 From Eq. 12.8-3 & 12.8-4 , Cs need not excee = 0.430

" I " : Seismic Importance Factor = 1.25 From Eq. 12.8-5 & 12.8-6, Cs not be less than = 0.010

**Cs : Seismic Response Coefficient = 0.0650**

**ASCE 7-16 Seismic Base Shear**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Seismic Base Shear Analysis**

**Seismic Base Shear**

ASCE 7-16 Section 12.8.1

$C_s = 0.0650$  from 12.8.1.1  
 $W$  ( see Sum  $W_i$  below ) = 7.60 k  
 Seismic Base Shear  $V = C_s * W = 0.49$  k

**Vertical Distribution of Seismic Forces**

ASCE 7-16 Section 12.8.3

"k" : hx exponent based on  $T_a = 1.00$

Table of building Weights by Floor Level...

Level #	$W_i$ : Weight	$H_i$ : Height	$(W_i * H_i^k)$	$C_{vx}$	$F_x = C_{vx} * V$	Sum Story Shear	Sum Story Moment
1	7.60	10.00	76.00	1.0000	0.49	0.49	0.00
Sum $W_i =$	7.60 k	Sum $W_i * H_i =$	76.00 k-ft		Total Base Shear =	0.49 k	Base Moment = 4.9 k-ft

**Diaphragm Forces : Seismic Design Category "B" to "F"**

ASCE 7-16 12.10.1.1

Level #	$W_i$	$F_i$	Sum $F_i$	Sum $W_i$	$F_{px}$ : Calcd	$F_{px}$ : Min	$F_{px}$ : Max	$F_{px}$	Dsgn. Force
1	7.60	0.49	0.49	7.60	0.49	0.12	0.25	0.25	0.49

- $W_{px}$  . . . . . Weight at level of diaphragm and other structure elements attached to it.
- $F_i$  . . . . . Design Lateral Force applied at the level.
- Sum  $F_i$  . . . . . Sum of "Lat. Force" of current level plus all levels above
- MIN Req'd Force @ Level . . .  $0.20 * S_{DS} * I * W_{px}$
- MAX Req'd Force @ Level . . .  $0.40 * S_{DS} * I * W_{px}$
- $F_{px}$  : Design Force @ Level .  $W_{px} * \text{SUM}(x \rightarrow n) F_i / \text{SUM}(x \rightarrow n) w_i$ ,  $x$  = Current level,  $n$  = Top Level

**Wind Loads - MWFRS all h (Except for Open Buildings)**

Kh (case 2) = 0.90 GCpi = +/-0.18  
 Base pressure (q<sub>h</sub>) = **27.3 psf** Bldg dim parallel to ridge = 150.0 ft G = 0.85  
 Roof Angle (θ) = 1.2 deg Bldg dim normal to ridge = 100.0 ft q<sub>i</sub> = q<sub>h</sub>  
 Roof tributary area: h = 20.0 ft  
 Wind normal to ridge =(h/2)\*L: 1500 sf ridge ht = 21.0 ft  
 Wind parallel to ridge =(h/2)\*L: 1000 sf

**Ultimate Wind Surface Pressures (psf)**

Surface	Wind Normal to Ridge				Wind Parallel to Ridge				
	L/B = 0.67		h/L = 0.20		L/B = 1.50		h/L = 0.13		
	C <sub>p</sub>	q <sub>h</sub> GC <sub>p</sub>	w/+q <sub>i</sub> GC <sub>pi</sub>	w/-q <sub>h</sub> GC <sub>pi</sub>	Dist.*	C <sub>p</sub>	q <sub>h</sub> GC <sub>p</sub>	w/+q <sub>i</sub> GC <sub>pi</sub>	w/-q <sub>h</sub> GC <sub>pi</sub>
Windward Wall (WW)	0.80	18.6	see table below			0.80	18.6	see table below	
Leeward Wall (LW)	-0.50	-11.6	-16.5	-6.7		-0.40	-9.3	-14.2	-4.4
Side Wall (SW)	-0.70	-16.3	-21.2	-11.3		-0.70	-16.3	-21.2	-11.3
Leeward Roof (LR)	**				Included in windward roof				
Neg Windward Roof: 0 to h/2*	-0.90	-20.9	-25.8	-16.0	0 to h/2*	-0.90	-20.9	-25.8	-16.0
h/2 to h*	-0.90	-20.9	-25.8	-16.0	h/2 to h*	-0.90	-20.9	-25.8	-16.0
h to 2h*	-0.50	-11.6	-16.5	-6.7	h to 2h*	-0.50	-11.6	-16.5	-6.7
> 2h*	-0.30	-7.0	-11.9	-2.0	> 2h*	-0.30	-7.0	-11.9	-2.0
Pos/min windward roof press.	-0.18	-4.2	-9.1	0.7	Min press.	-0.18	-4.2	-9.1	0.7

\*\*Roof angle < 10 degrees. Therefore, leeward roof is included in windward roof pressure zones.

\*Horizontal distance from windward edge

For monoslope roofs, entire roof surface is either windward or leeward surface.

**Parapet**

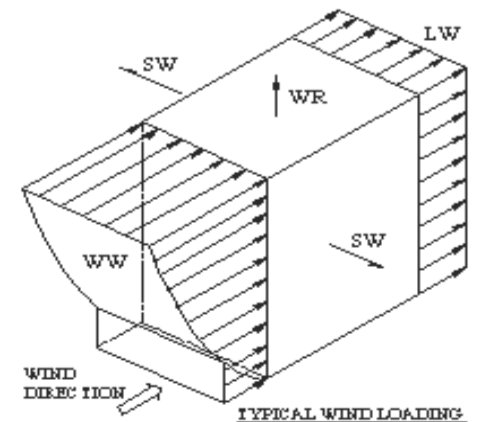
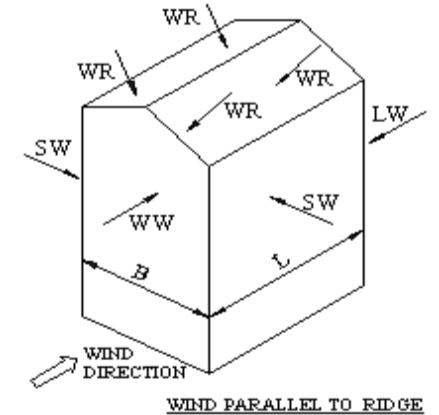
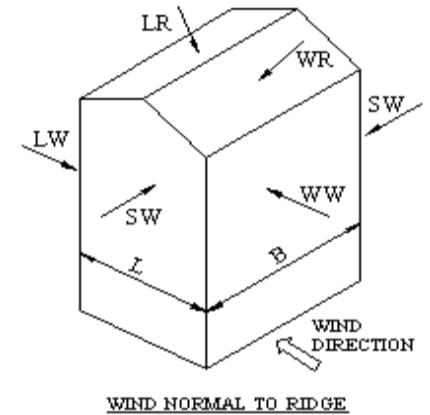
z	Kz	Kzt	qp (psf)
0.0 ft	0.85	1.00	0.0

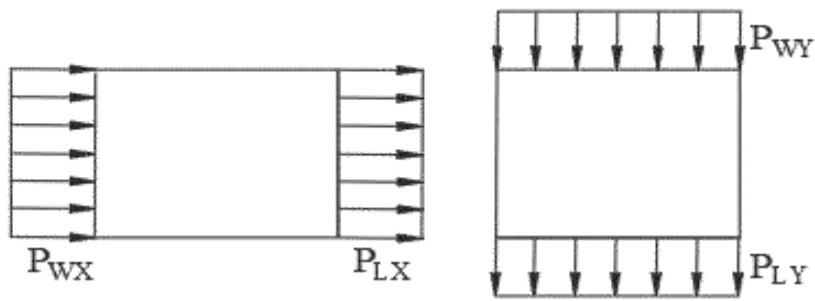
Windward parapet: 0.0 psf (GC<sub>pn</sub> = +1.5)  
 Leeward parapet: 0.0 psf (GC<sub>pn</sub> = -1.0)

Windward roof overhangs : 18.6 psf (upward - add to windward roof pressure)

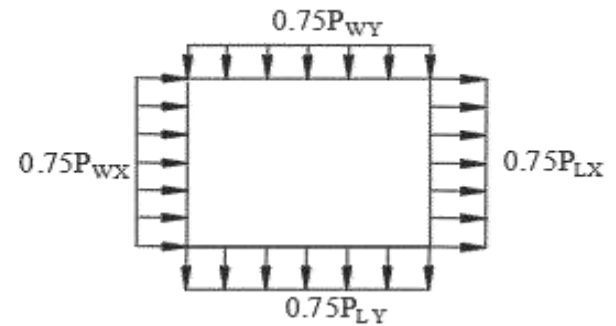
**Windward Wall Pressures at "z" (psf)**

z	Kz	Kzt	Windward Wall			Combined WW + LW	
			q <sub>z</sub> GC <sub>p</sub>	w/+q <sub>i</sub> GC <sub>pi</sub>	w/-q <sub>h</sub> GC <sub>pi</sub>	Wind Normal to Ridge	Wind Parallel to Ridge
0 to 15'	0.85	1.00	17.5	12.6	22.4	29.1	26.8
h= 20.0 ft	0.90	1.00	18.6	13.7	23.5	30.2	27.9
ridge = 21.0 ft	0.91	1.00	18.8	13.9	23.7	30.4	28.1

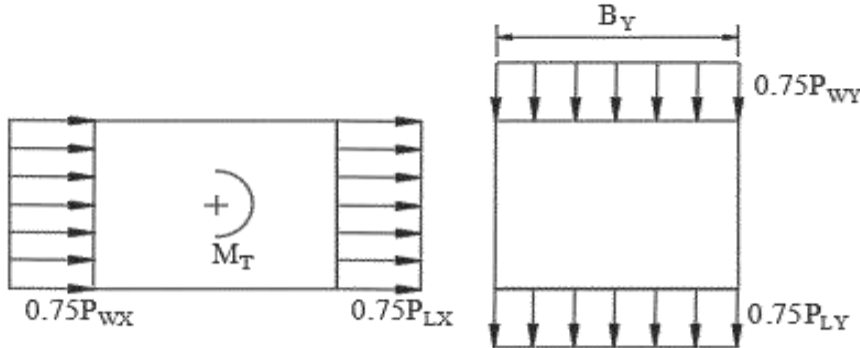




CASE 1



CASE 3



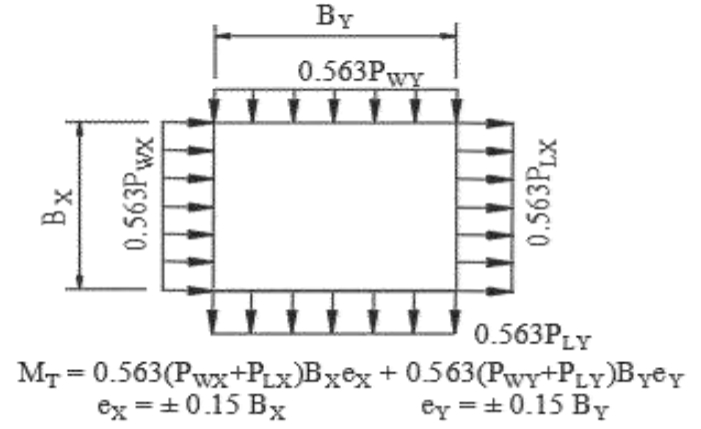
$$M_T = 0.75(P_{WX} + P_{LX})B_X e_X$$

$$e_X = \pm 0.15 B_X$$

$$M_T = 0.75(P_{WY} + P_{LY})B_Y e_Y$$

$$e_Y = \pm 0.15 B_Y$$

CASE 2



$$M_T = 0.563(P_{WX} + P_{LX})B_X e_X + 0.563(P_{WY} + P_{LY})B_Y e_Y$$

$$e_X = \pm 0.15 B_X \quad e_Y = \pm 0.15 B_Y$$

CASE 4

**Wind Forces at Floors**

Total Floors = 1  
 T/Fdn (dist below grade) = 2.0 ft

Building dimension (parallel with ridge) = 150.0 ft  
 Building dimension (normal to ridge) = 100.0 ft  
 L is the building dimension parallel to the wind direction

e = 22.50 ft  
 e = 15.00 ft

Level	Elevation Above Grade (ft)	Height of Centroid to Fdn (ft)	Wind Normal to Ridge						Wind Parallel to Ridge			
			L	B	Area (sf)	Applied Force (k)	Story Shear (k)	Overturning Moment ('k)	Area	Applied Force (k)	Story Shear (k)	Overturning Moment ('k)
Equip, etc		0.00	wind on equip, screenwalls, etc =						0.0			
Parapet	0.00	0.00				0.0			0.0			
T/Ridge	0.00	0.00			0.0	0.0		0.0	0.0			0.0
Roof	15.00	17.00	100.0	150.0	1,125.0	32.7	32.7	0.0	750.0	20.1	20.1	0.0
1	0.00	2.00	100.0	150.0	1,125.0	32.7	65.5	491.1	750.0	20.1	40.2	301.3
FDN		0.00						622.1				381.6



Uhaul Propane Tank Calcs

Loads

Empty tank weight = 2330#  
Capacity = 1000 gallons  
Weight = 4.25#\*1000 = 4250#  
Weight of tank legs + misc. = 170#  
Total weight = 7600#

Seismic Loads

R = 2.5  
  
Lateral seismic force = 0.196\*weight = 1490#

Wind Loads

Wind Pressure = 31 psf (see attached printout)  
  
Tank area = 3.5'\*20' = 70 sq ft  
Total wind load = 31\*70 = 2170 #

Therefore wind load governs.

Worst case loads

Empty tank + Wind  
Overturning moment = 2170\*10' = 21700 #ft  
Spacing between anchor locations = 15"  
Resisting moment = 2300\*15/12 = 2875 #ft  
Net moment = 18825 #ft  
Net uplift = 18825/(30/12) = 7530 #  
Net uplift per bolt = 3765 #



Sheet No. \_\_\_\_\_

Project No. 23668

Date 10/18/2023

Computed By SS

Project Name Uhaul Propane IA

Subject \_\_\_\_\_

Crash Post Design

Height = 4'  
Loads = 3k at 3' height  
Designed for vehicle crash loads

See attached detail and printout for  
crash post design

Grid area for design details

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Code References**

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combinations Used : IBC 2018

**General Information**

**Material Properties**

f <sub>c</sub> : Concrete 28 day strength	3.0 ksi
f <sub>y</sub> : Rebar Yield	60.0 ksi
E <sub>c</sub> : Concrete Elastic Modulus	3,122.0 ksi
Concrete Density	145.0 pcf
φ : Phi Values	
Flexure :	0.90
Shear :	0.750

**Analysis/Design Settings**

Calculate footing weight as dead load ?	Yes
Calculate Pedestal weight as dead load ?	No
Min Steel % Bending Reinf (based on 'd')	
Min Allow % Temp Reinf (based on thick)	0.00180
Min. Overturning Safety Factor	1.0: 1
Min. Sliding Safety Factor	1.0: 1

**Soil Information**

Allowable Soil Bearing	2.0 ksf
Increase Bearing By Footing Weight	No
Soil Passive Sliding Resistance	250.0 pcf
<i>(Uses entry for "Footing base depth below soil surface" for force)</i>	
Coefficient of Soil/Concrete Friction	0.30

**Soil Bearing Increase**

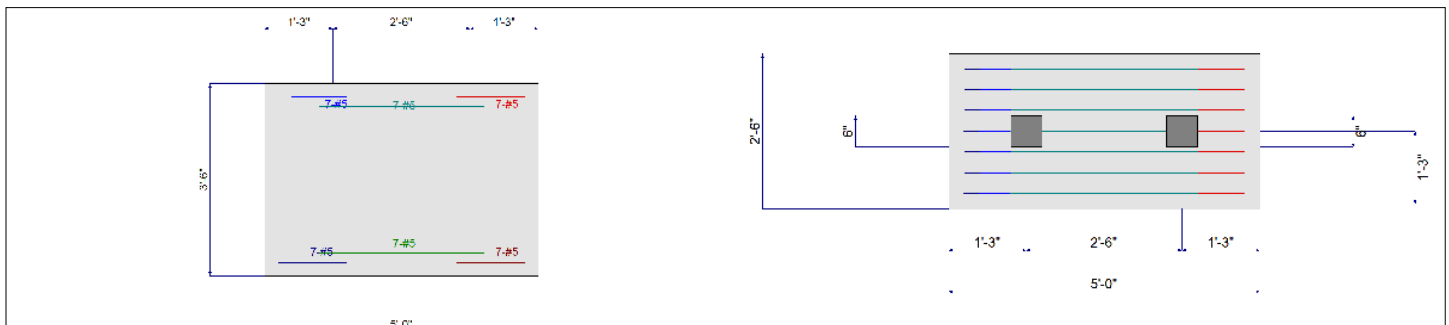
Footing base depth below soil surface	ft
Increases based on footing Depth . . . .	
Allowable pressure increase per foot when base of footing is below	ksf
ft	
Increases based on footing Width . . .	
Allowable pressure increase per foot when maximum length or width is greater tha	ksf
ft	
Maximum Allowed Bearing Pressure	10.0 ksf
<i>(A value of zero implies no limit)</i>	
Adjusted Allowable Soil Bearing	2.0 ksf
<i>(Allowable Soil Bearing adjusted for footing weight and depth &amp; width increases as specified by user.)</i>	

**Dimensions & Reinforcing**

Distance Left of Column #1 = 1.250 ft	Pedestal dimensions...	Col #1	Col #2	<b>Bars left of Col #1</b>	Count	Size #	As Provided	As Req'd							
Between Columns = 2.50 ft									Sq. Dim. = 6.0	6.0 in	Bottom Bars	7.0	5	2.170	2.268 in^2
Distance Right of Column #2 = 1.250 ft											Top Bars	7.0	5	2.170	2.268 in^2
Total Footing Length = 5.0 ft	Height =			<b>Bars Btwn Cols</b>											
Footing Width = 2.50 ft				Bottom Bars	7.0	5	2.170	2.268 in^2							
Footing Thickness = 42.0 in				Top Bars	7.0	5	2.170	2.268 in^2							
Rebar Center to Concrete Edge @ Top = 3.0 in				<b>Bars Right of Col #2</b>											
Rebar Center to Concrete Edge @ Bottom = 3.0 in				Bottom Bars	7.0	5	2.170	2.268 in^2							
				Top Bars	7.0	5	2.170	0.0 in^2							

**Applied Loads**

<b>Applied @ Left Column</b>	<b>D</b>	<b>Lr</b>	<b>L</b>	<b>S</b>	<b>W</b>	<b>E</b>	<b>H</b>
Axial Load Downward =	-3.760						k
Moment (+CW) =							k-ft
Shear (+X) =							k
<b>Applied @ Right Column</b>							
Axial Load Downward =	3.80						k
Moment (+CW) =							k-ft
Shear (+X) =							k
<b>Overburden</b>							



**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**DESIGN SUMMARY**

**Design OK**

Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS 1.462	Overturning	14.10 k-ft	20.609 k-ft	D Only
PASS No Sliding	Sliding	0.0 k	1.915 k	No Sliding
PASS 2.698	Uplift	3.760 k	10.144 k	D Only

Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS 0.8330	Soil Bearing	1.666 ksf	2.0 ksf	D Only
PASS 0.01167	1-way Shear - Col #1	0.9588 psi	82.158 psi	+1.40D
PASS 0.01167	1-way Shear - Col #2	0.9589 psi	82.158 psi	+1.40D
PASS 0.002938	2-way Punching - Col #1	0.4827 psi	164.317 psi	+1.40D
PASS 0.003650	2-way Punching - Col #2	0.5997 psi	164.317 psi	+1.40D
PASS 0.002325	Flexure - Left of Col #1 - Top	-0.8661 k-ft	372.525 k-ft	+1.40D
PASS No Bending	Flexure - Left of Col #1 - Bottom	0.0 k-ft	0.0 k-ft	N/A
PASS 0.001832	Flexure - Between Cols - Top	-0.6823 k-ft	372.525 k-ft	+1.40D
PASS 0.005827	Flexure - Between Cols - Bottom	2.171 k-ft	372.525 k-ft	+1.40D
PASS No Bending	Flexure - Right of Col #2 - Top	0.0 k-ft	0.0 k-ft	N/A
PASS 0.00450	Flexure - Right of Col #2 - Bottom	1.676 k-ft	372.525 k-ft	+1.40D

**Soil Bearing**

Load Combination...	Total Bearing	Eccentricity from Ftg CL	Actual Soil Bearing Stress		Allowable	Actual / Allow Ratio
			@ Left Edge	@ Right Edge		
D Only	6.38 k	1.480 ft	0.00 ksf	1.67 ksf	2.00 ksf	0.833
+0.60D	3.83 k	1.480 ft	0.00 ksf	1.00 ksf	2.00 ksf	0.500

**Overturning Stability**

Load Combination...	Moments about Left Edge k-ft			Moments about Right Edge k-ft		
	Overturning	Resisting	Ratio	Overturning	Resisting	Ratio
D Only	4.70	30.11	6.406	14.10	20.61	1.462
+0.60D	2.82	18.07	6.406	8.46	12.37	1.462

**Sliding Stability**

Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio
D Only	0.00 k	1.92 k	999
+0.60D	0.00 k	1.15 k	999

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+0.60D	0.000	0.000	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.013	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.025	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.038	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.050	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.063	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.075	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.088	0	0.000	0	0.000	0.000	0.000
+0.60D	0.000	0.100	0	0.000	0	0.000	0.000	0.000
+1.40D	-0.011	0.113	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.014	0.125	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.017	0.138	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.020	0.150	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.023	0.163	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.027	0.175	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.031	0.188	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.036	0.200	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.040	0.213	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.045	0.225	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.050	0.238	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.056	0.250	Top	2.268	Min Temp %	2.170	372.525	0.000



**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	-0.061	0.263	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.067	0.275	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.073	0.288	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.080	0.300	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.087	0.313	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.094	0.325	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.101	0.338	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.109	0.350	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.117	0.363	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.125	0.375	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.133	0.388	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.142	0.400	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.151	0.413	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.160	0.425	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.170	0.438	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.180	0.450	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.190	0.463	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.200	0.475	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.211	0.488	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.222	0.500	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.233	0.513	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.245	0.525	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.257	0.538	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.269	0.550	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.281	0.563	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.294	0.575	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.307	0.588	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.320	0.600	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.333	0.613	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.347	0.625	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.361	0.638	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.375	0.650	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.390	0.663	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.405	0.675	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.420	0.688	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.435	0.700	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.451	0.713	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.467	0.725	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.483	0.738	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.500	0.750	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.516	0.763	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.533	0.775	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.551	0.788	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.568	0.800	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.586	0.813	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.604	0.825	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.623	0.838	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.642	0.850	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.661	0.863	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.680	0.875	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.700	0.888	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.719	0.900	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.740	0.913	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.760	0.925	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.781	0.938	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.802	0.950	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.823	0.963	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.844	0.975	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.866	0.988	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.888	1.000	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.910	1.013	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.930	1.025	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.949	1.038	Top	2.268	Min Temp %	2.170	372.525	0.003

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	-0.966	1.050	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.982	1.063	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.997	1.075	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.010	1.088	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.022	1.100	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.033	1.113	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.042	1.125	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.050	1.138	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.059	1.150	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.061	1.163	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.065	1.175	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.067	1.188	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.068	1.200	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.068	1.213	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.066	1.225	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.063	1.238	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.059	1.250	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.053	1.263	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.046	1.275	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.037	1.288	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.027	1.300	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.016	1.313	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-1.003	1.325	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.989	1.338	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.974	1.350	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.957	1.363	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.939	1.375	Top	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	-0.919	1.388	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.898	1.400	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.876	1.413	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.853	1.425	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.828	1.438	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.801	1.450	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.774	1.463	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.745	1.475	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.714	1.488	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.682	1.500	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.650	1.513	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.618	1.525	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.586	1.538	Top	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	-0.555	1.550	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.523	1.563	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.492	1.575	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.462	1.588	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.431	1.600	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.401	1.613	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.371	1.625	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.342	1.638	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.312	1.650	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.283	1.663	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.255	1.675	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.226	1.688	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.198	1.700	Top	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	-0.170	1.713	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.142	1.725	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.115	1.738	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.088	1.750	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.061	1.763	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	-0.035	1.775	Top	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.000	1.788	0	0.000	0	0.000	0.000	0.000
+1.40D	0.018	1.800	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.043	1.813	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.069	1.825	Bottom	2.268	Min Temp %	2.170	372.525	0.000

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	0.094	1.838	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.119	1.850	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.143	1.863	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.168	1.875	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.192	1.888	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.215	1.900	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.239	1.913	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.262	1.925	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.285	1.938	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.308	1.950	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.330	1.963	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.352	1.975	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.374	1.988	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.396	2.000	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.417	2.013	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.438	2.025	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.459	2.038	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.479	2.050	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.500	2.063	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.520	2.075	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.539	2.088	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.559	2.100	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.578	2.112	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.598	2.125	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.616	2.137	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.635	2.150	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.654	2.162	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.672	2.175	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.690	2.187	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.708	2.200	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.725	2.212	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.743	2.225	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.760	2.237	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.777	2.250	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.794	2.262	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.811	2.275	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.827	2.287	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.844	2.300	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.860	2.312	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.876	2.325	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.892	2.337	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.908	2.350	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.923	2.362	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.938	2.375	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.954	2.387	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.969	2.400	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.984	2.412	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.999	2.425	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.013	2.437	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.028	2.450	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.042	2.462	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.057	2.475	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.071	2.487	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.085	2.500	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.099	2.512	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.113	2.525	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.126	2.537	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.140	2.550	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.154	2.562	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.167	2.575	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.180	2.587	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.194	2.600	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.207	2.612	Bottom	2.268	Min Temp %	2.170	372.525	0.003

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	1.220	2.625	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.233	2.637	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.246	2.650	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.259	2.662	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.272	2.675	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.285	2.687	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.298	2.700	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.310	2.712	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.323	2.725	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.336	2.737	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.348	2.750	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.361	2.762	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.373	2.775	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.386	2.787	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.398	2.800	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.411	2.812	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.423	2.825	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.435	2.837	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.448	2.850	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.460	2.862	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.473	2.875	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.485	2.887	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.497	2.900	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.510	2.912	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.522	2.925	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.535	2.937	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.547	2.950	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.559	2.962	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.572	2.975	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.584	2.987	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.597	3.000	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.610	3.012	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.622	3.025	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.635	3.037	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.648	3.050	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.660	3.062	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.673	3.075	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.686	3.087	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.699	3.100	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.712	3.112	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.725	3.125	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.739	3.137	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.752	3.150	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.765	3.162	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.779	3.175	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.792	3.187	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.806	3.200	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.819	3.212	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.833	3.225	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.847	3.237	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.861	3.250	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.875	3.262	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.890	3.275	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.904	3.287	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.919	3.300	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.933	3.312	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.948	3.325	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.963	3.337	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.978	3.350	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.993	3.362	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	2.009	3.375	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	2.024	3.387	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	2.040	3.400	Bottom	2.268	Min Temp %	2.170	372.525	0.005

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	2.055	3.412	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.071	3.425	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.088	3.437	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.104	3.450	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.120	3.462	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.137	3.475	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.154	3.487	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.171	3.500	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.187	3.512	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.202	3.525	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.216	3.537	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.228	3.550	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.238	3.562	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.247	3.575	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.255	3.587	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.261	3.600	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.266	3.612	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.269	3.625	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.271	3.637	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.271	3.650	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.270	3.662	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.268	3.675	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.264	3.687	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.258	3.700	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.252	3.712	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.243	3.725	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.234	3.737	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.223	3.750	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.211	3.762	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.197	3.775	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.182	3.787	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.165	3.800	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.147	3.812	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.128	3.825	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.107	3.837	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.085	3.850	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.062	3.862	Bottom	2.268	Min Temp %	2.170	372.525	0.006
+1.40D	2.037	3.875	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	2.011	3.887	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.984	3.900	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.955	3.912	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.924	3.925	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.893	3.937	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.860	3.950	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.826	3.962	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.790	3.975	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.753	3.987	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.715	4.000	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.676	4.012	Bottom	2.268	Min Temp %	2.170	372.525	0.005
+1.40D	1.638	4.025	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.600	4.037	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.562	4.050	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.525	4.062	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.488	4.075	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.451	4.087	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.415	4.100	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.379	4.112	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.344	4.125	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.308	4.137	Bottom	2.268	Min Temp %	2.170	372.525	0.004
+1.40D	1.274	4.150	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.239	4.162	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.205	4.175	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.172	4.187	Bottom	2.268	Min Temp %	2.170	372.525	0.003

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	1.138	4.200	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.106	4.212	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.073	4.225	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.041	4.237	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	1.010	4.250	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.978	4.262	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.948	4.275	Bottom	2.268	Min Temp %	2.170	372.525	0.003
+1.40D	0.917	4.287	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.887	4.300	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.858	4.312	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.829	4.325	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.800	4.337	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.772	4.350	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.744	4.362	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.717	4.375	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.690	4.387	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.663	4.400	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.637	4.412	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.612	4.425	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.587	4.437	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.562	4.450	Bottom	2.268	Min Temp %	2.170	372.525	0.002
+1.40D	0.538	4.462	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.514	4.475	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.491	4.487	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.469	4.500	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.446	4.512	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.425	4.525	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.403	4.537	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.383	4.550	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.363	4.562	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.343	4.575	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.324	4.587	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.305	4.600	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.287	4.612	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.269	4.625	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.252	4.637	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.235	4.650	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.219	4.662	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.204	4.675	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.189	4.687	Bottom	2.268	Min Temp %	2.170	372.525	0.001
+1.40D	0.174	4.700	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.161	4.712	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.147	4.725	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.134	4.737	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.122	4.750	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.110	4.762	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.099	4.775	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.089	4.787	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.079	4.800	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.069	4.812	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.061	4.825	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.052	4.837	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.045	4.850	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.038	4.862	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.031	4.875	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.025	4.887	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.020	4.900	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.015	4.912	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.011	4.925	Bottom	2.268	Min Temp %	2.170	372.525	0.000
+1.40D	0.000	4.937	0	0.000	0	0.000	0.000	0.000
+1.40D	0.000	4.950	0	0.000	0	0.000	0.000	0.000
+1.40D	0.000	4.962	0	0.000	0	0.000	0.000	0.000
+1.40D	0.000	4.975	0	0.000	0	0.000	0.000	0.000

**Combined Footing**

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Tank Footing**

**Z-Axis Footing Flexure - Maximum Values for Load Combination**

Load Combination...	Mu (ft-k)	Distance from left (ft)	Tension Side	As Req'd (in^2)	Governed by	Actual As (in^2)	Phi*Mn (ft-k)	Mu / PhiMn
+1.40D	0.000	4.987	0	0.000	0	0.000	0.000	0.000
+1.40D	0.000	5.000	0	0.000	0	0.000	0.000	0.000

**One Way Shear**

**Punching Shear**

Load Combination...	Phi Vn	vu @ Col #1	vu @ Col #2	Phi Vn	vu @ Col #1	vu @ Col #2
+1.40D	82.16 psi	0.96 psi	0.96 psi	164.32 psi	0.48psi	0.60 psi
+1.20D	82.16 psi	0.82 psi	0.82 psi	164.32 psi	0.41psi	0.51 psi
+0.90D	82.16 psi	0.62 psi	0.62 psi	164.32 psi	0.31psi	0.39 psi

## Pole Footing Embedded in Soil

Project File: 23668.ec6

LIC# : KW-06012847, Build:20.23.10.02

United Structural Design

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Crash Post footing

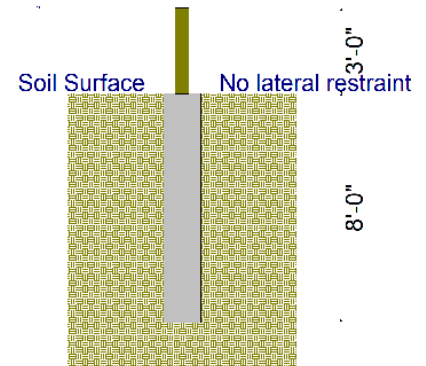
### Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16  
 Load Combinations Used : IBC 2018

### General Information

Pole Footing Shape                      Circular  
 Pole Footing Diameter                    16.0 in  
 Calculate Min. Depth for Allowable Pressures  
 No Lateral Restraint at Ground Surface  
 Allow Passive                                350.0 pcf  
 Max Passive                                 1,500.0 psf

Point Load



### Controlling Values

Governing Load Combination        D Only  
 Lateral Load                                3.0 k  
 Moment                                        9.0 k-ft

NO Ground Surface Restraint

Pressures at 1/3 Depth  
 Actual                                        **930.31 psf**  
 Allowable                                    **930.86 psf**

**Minimum Required Depth                8.0 ft**

Footing Base Area                        1.396 ft<sup>2</sup>  
 Maximum Soil Pressure                    0.0 ksf

### Applied Loads

Lateral Concentrated Load (k)	Lateral Distributed Loads (k)	Vertical Load (k)
D : Dead Load                    3.0 k		k
Lr : Roof Live                      k		k
L : Live                                k		k
S : Snow                                k		k
W : Wind                                k		k
E : Earthquake                      k		k
H : Lateral Earth                    k		k
Load distance above ground surface    3.0 ft	TOP of Load above ground surface    ft	
	BOTTOM of Load above ground surface    ft	

### Load Combination Results

Load Combination	Forces @ Ground Surface		Required Depth - (ft)	Pressure at 1/3 Depth		Soil Increase Factor
	Loads - (k)	Moments - (ft-k)		Actual - (psf)	Allow - (psf)	
D Only	3.000	9.000	8.00	930.3	930.9	1.000
+0.60D	1.800	5.400	6.50	745.7	746.8	1.000





Anchor Designer™  
Software  
Version 3.0.7947.0

Company:		Date:	10/18/2023
Engineer:		Page:	1/5
Project:			
Address:			
Phone:			
E-mail:			

### 1. Project information

Customer company:  
Customer contact name:  
Customer e-mail:  
Comment:

Project description:  
Location:  
Fastening description:

### 2. Input Data & Anchor Parameters

#### General

Design method: ACI 318-14  
Units: Imperial units

#### Anchor Information:

Anchor type: Cast-in-place  
Material: AB  
Diameter (inch): 0.875  
Effective Embedment depth,  $h_{ef}$  (inch): 5.000  
Anchor category: -  
Anchor ductility: Yes  
 $h_{min}$  (inch): 7.38  
 $C_{min}$  (inch): 5.25  
 $S_{min}$  (inch): 5.25

#### Base Material

Concrete: Normal-weight  
Concrete thickness,  $h$  (inch): 12.00  
State: Uncracked  
Compressive strength,  $f'_c$  (psi): 3000  
 $\Psi_{c,v}$ : 1.0  
Reinforcement condition: B tension, B shear  
Supplemental reinforcement: No  
Reinforcement provided at corners: No  
Ignore concrete breakout in tension: No  
Ignore concrete breakout in shear: No  
Ignore  $6d_o$  requirement: No  
Build-up grout pad: No

#### Base Plate

Length x Width x Thickness (inch): 6.00 x 6.00 x 0.25

#### Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB7 (7/8"Ø)



Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com



Anchor Designer™  
Software  
Version 3.0.7947.0

Company:		Date:	10/18/2023
Engineer:		Page:	2/5
Project:			
Address:			
Phone:			
E-mail:			

### Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

Strength level loads:

$N_{ua}$  [lb]: 3765

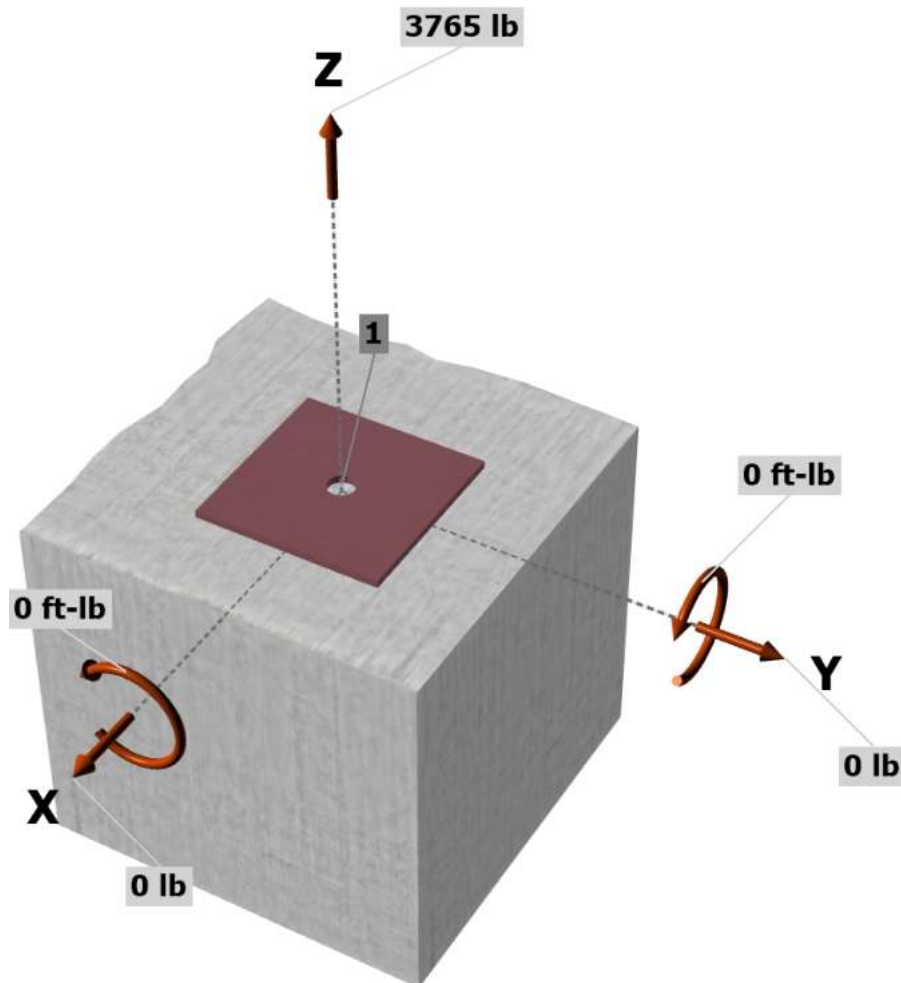
$V_{uax}$  [lb]: 0

$V_{uay}$  [lb]: 0

$M_{ux}$  [ft-lb]: 0

$M_{uy}$  [ft-lb]: 0

<Figure 1>



Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

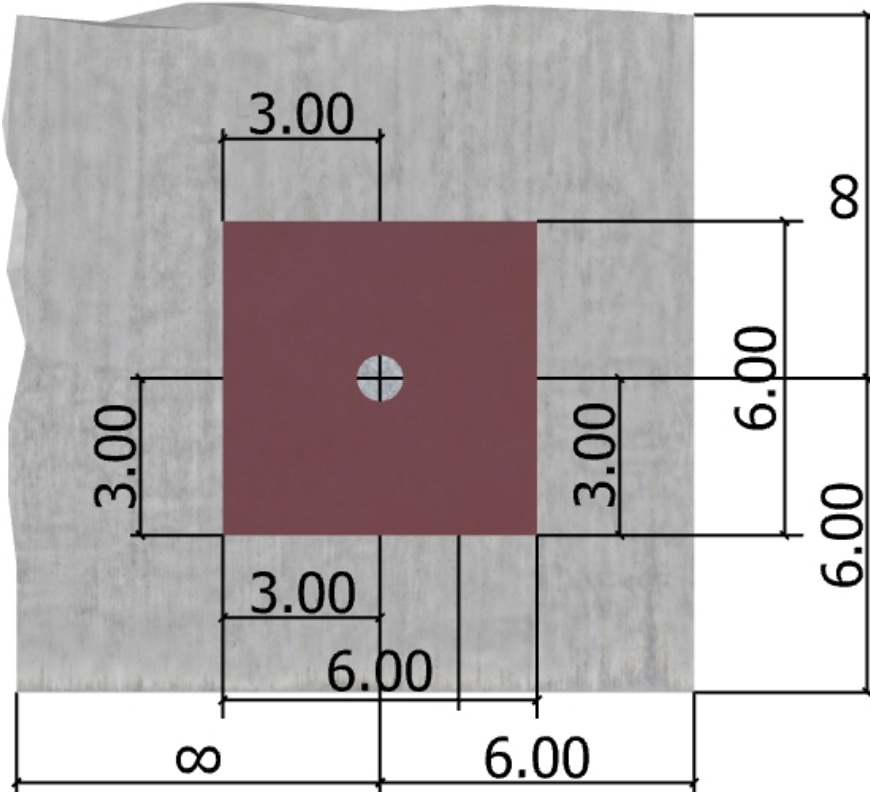
Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com



Anchor Designer™  
Software  
Version 3.0.7947.0

Company:		Date:	10/18/2023
Engineer:		Page:	3/5
Project:			
Address:			
Phone:			
E-mail:			

<Figure 2>



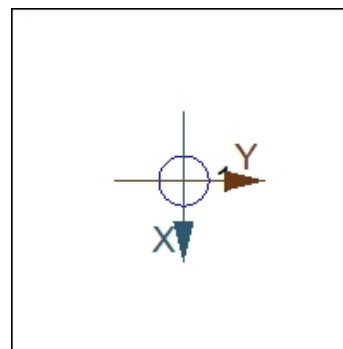
Company:		Date:	10/18/2023
Engineer:		Page:	4/5
Project:			
Address:			
Phone:			
E-mail:			

### 3. Resulting Anchor Forces

Anchor	Tension load, N <sub>ua</sub> (lb)	Shear load x, V <sub>uax</sub> (lb)	Shear load y, V <sub>uay</sub> (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	3765.0	0.0	0.0	0.0
Sum	3765.0	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.00  
 Maximum concrete compression stress (psi): 0  
 Resultant tension force (lb): 3765  
 Resultant compression force (lb): 0  
 Eccentricity of resultant tension forces in x-axis, e'<sub>Nx</sub> (inch): 0.00  
 Eccentricity of resultant tension forces in y-axis, e'<sub>Ny</sub> (inch): 0.00

<Figure 3>



### 4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N <sub>sa</sub> (lb)	φ	φN <sub>sa</sub> (lb)
26795	0.75	20096

### 5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5} \text{ (Eq. 17.4.2.2a)}$$

k <sub>c</sub>	λ <sub>a</sub>	f' <sub>c</sub> (psi)	h <sub>ef</sub> (in)	N <sub>b</sub> (lb)
24.0	1.00	3000	5.000	14697

$$\phi N_{cb} = \phi (A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1a)}$$

A <sub>Nc</sub> (in <sup>2</sup> )	A <sub>Nco</sub> (in <sup>2</sup> )	c <sub>a,min</sub> (in)	Ψ <sub>ed,N</sub>	Ψ <sub>c,N</sub>	Ψ <sub>cp,N</sub>	N <sub>b</sub> (lb)	φ	φN <sub>cb</sub> (lb)
216.64	225.00	6.00	0.940	1.25	1.000	14697	0.70	11639

### 6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8 A_{brg} f'_c \text{ (Sec. 17.3.1, Eq. 17.4.3.1 \& 17.4.3.4)}$$

Ψ <sub>c,P</sub>	A <sub>brg</sub> (in <sup>2</sup> )	f' <sub>c</sub> (psi)	φ	φN <sub>pn</sub> (lb)
1.4	4.07	3000	0.70	95609

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com



Anchor Designer™  
Software  
Version 3.0.7947.0

Company:		Date:	10/18/2023
Engineer:		Page:	5/5
Project:			
Address:			
Phone:			
E-mail:			

## 11. Results

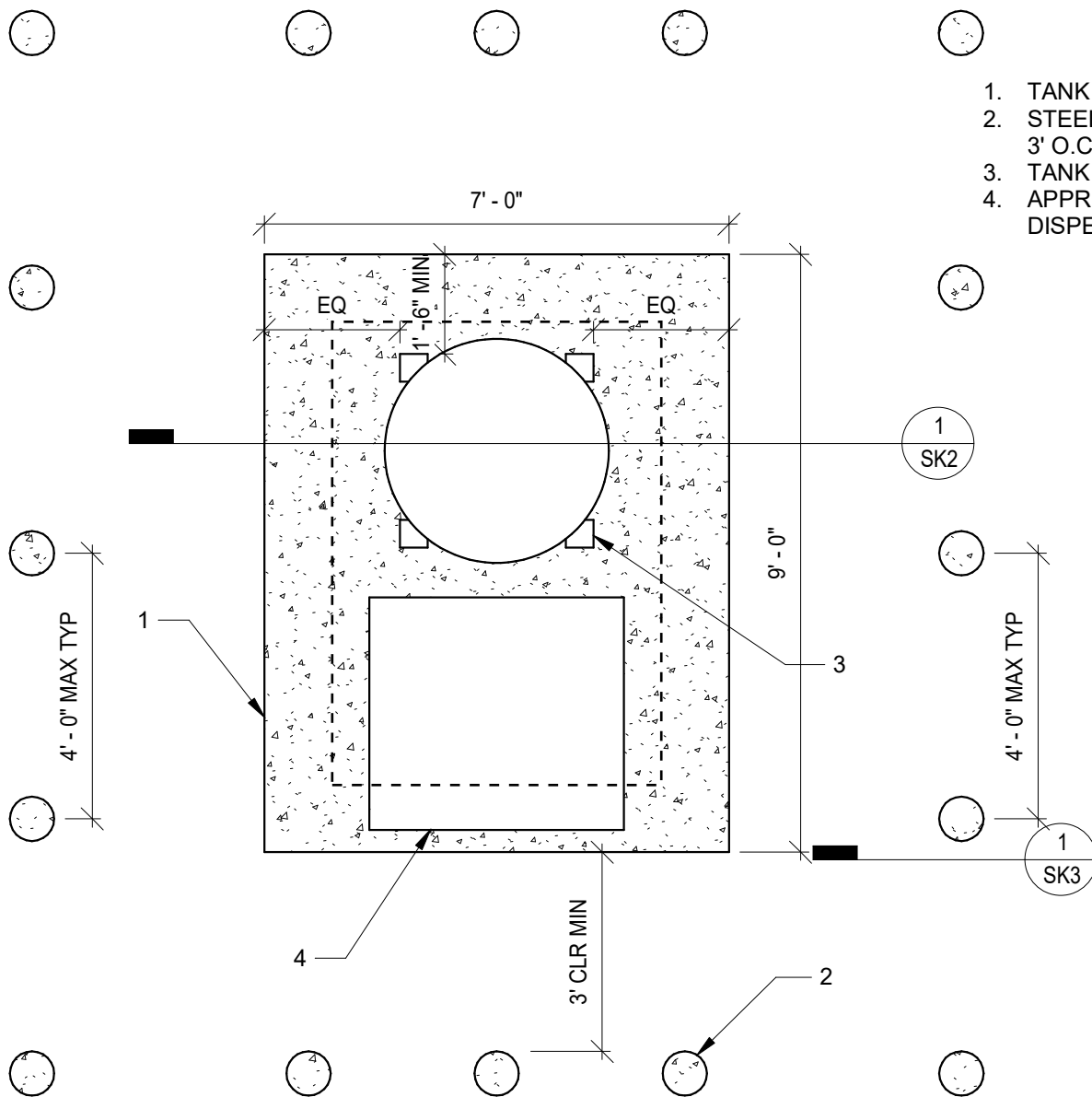
### 11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, $N_{ua}$ (lb)	Design Strength, $\phi N_n$ (lb)	Ratio	Status
Steel	3765	20096	0.19	Pass
<b>Concrete breakout</b>	<b>3765</b>	<b>11639</b>	<b>0.32</b>	<b>Pass (Governs)</b>
Pullout	3765	95609	0.04	Pass

PAB7 (7/8"Ø) with hef = 5.000 inch meets the selected design criteria.

## 12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.



1. TANK FOOTING. SEE SK2.
2. STEEL CRASH BOLLARDS AT 3' O.C. SEE SK3.
3. TANK POSTS. SEE SK2.
4. APPROXIMATE LOCATION OF DISPENSER CABINET.

**1** TANK FOOTING AND CRASH BOLLARDS  
NO SCALE



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

*John Elder* 01/03/2024  
(signature) (date)

SEAL  
John Brittan Elder  
License number #P25413  
My license renewal date is December 31, 2024.

Pages or sheets covered by this seal:

UHAUL PROPANE IA

SHEET NUMBER

**SK1**

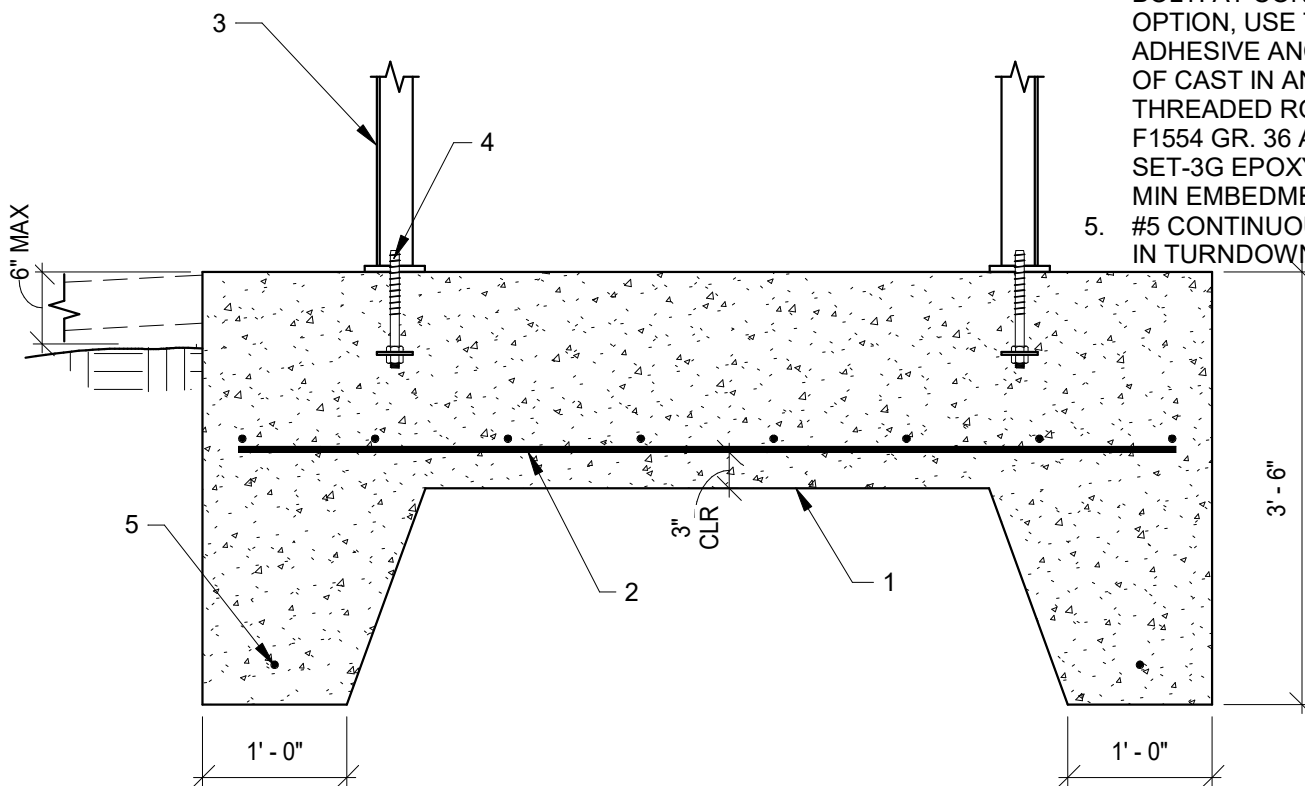
1100 EAST HICKMAN  
WAUKEE, IA 50263

**UNITED**  
STRUCTURAL DESIGN LLC  
2058 S. DOBSON RD. SUITE 10, MESA, AZ 85202  
OFFICE: (480) 454-6408 | www.unitedstr.com  
USD Project No.:-  
Project No.:-

DESIGN CRITERIA:

$f_c = 4,500$  PSI  
 $F_y = 60,000$  KSI  
 soil bearing pressure = 1,500 PSF

1. 7'-0"x9'-0"x1'-6" THICK SQUARE FOOTING.
2. (8) #5 REINFORCING IN LONG DIRECTION AND (10) #5 REINFORCING IN SHORT DIRECTION BOTTOM OF FOOTING.
3. TANK COLUMNS AND BASE PLATE BY OTHERS.
4. 7/8" DIA. ANCHOR BOLT AT EACH COLUMN. MIN. 12" EMBEDMENT. (2) STANDARD NUTS AND 1/4"x6"x6" PLATE WASHER AT END OF EACH BOLT. AT CONTRACTOR'S OPTION, USE THREADED ROD ADHESIVE ANCHORS IN LIEU OF CAST IN ANCHORS. THREADED RODS SHALL BE F1554 GR. 36 AND SIMPSON SET-3G EPOXY. PROVIDE 12" MIN EMBEDMENT.
5. #5 CONTINUOUS REINFORCING IN TURNDOWN.



1 PROPANE TANK FOOTING  
 NO SCALE



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

*John Elder* 01/03/2024  
 (signature) (date)  
 SEAL

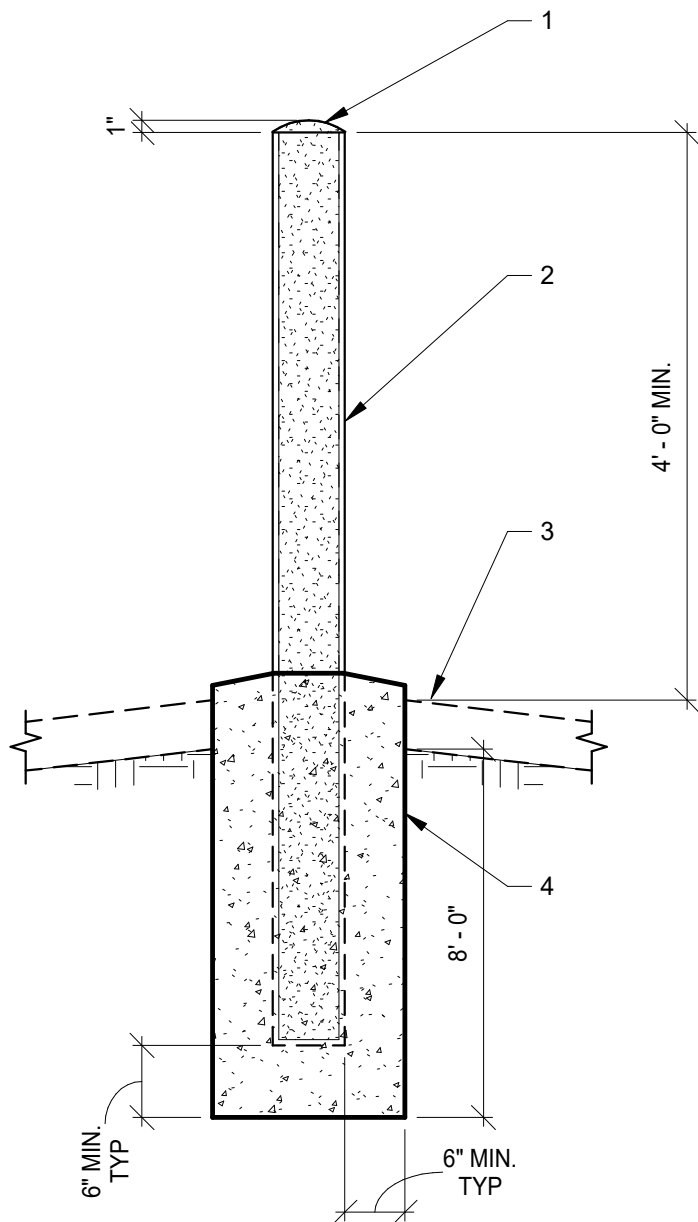
John Brittan Elder  
 License number #P25413  
 My license renewal date is December 31, 2024.  
 Pages or sheets covered by this seal:

UHAUL PROPANE IA SHEET NUMBER

SK2

1100 EAST HICKMAN  
 WAUKEE, IA 50263

**UNITED**  
 STRUCTURAL DESIGN LLC  
 2058 S. DOBSON RD. SUITE 10, MESA, AZ 85202  
 OFFICE: (480) 454-6408 | www.unitedstr.com  
 USD Project No.:-  
 Project No.:-



1. FILL WITH GROUT AND CROWN TOP.
2. 4" STD STEEL POST. SCHEDULE 40; GALVANIZED.
3. FINISHED GRADE, CONCRETE SLAB, OR ASPHALT AS OCCURS.
4. 16" DIA. CONCRETE FOOTING (CLASS B) F'c = 2,500.

NOTES:

- SAFETY POST SHALL COMPLY WITH THE MINIMUM REQUIREMENTS OF NFP 58, CITY, AND AHJ.
- BOLLARD SPACING SHALL NOT EXCEED 4 FEET BETWEEN POSTS ON CENTER.
- BOLLARDS SHALL BE LOCATED MINIMUM 3 FEET CLEAR FROM PROPANE TANK.

**1 STEEL CRASH POST (BOLLARD)**  
NO SCALE

3251-1S-07  
192-01

SK1



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

*John Elder* 01/03/2024  
(signature) (date)  
SEAL

John Brittan Elder  
License number #P25413  
My license renewal date is December 31, 2024.  
Pages or sheets covered by this seal:

UHAUL PROPANE IA

SHEET NUMBER

SK3

**UNITED**  
STRUCTURAL DESIGN LLC  
2058 S. DOBSON RD. SUITE 10, MESA, AZ 85202  
OFFICE: (480) 454-6408 | www.unitedstr.com  
USD Project No.:-  
Project No.:-

1100 EAST HICKMAN  
WAUKEE, IA 50263

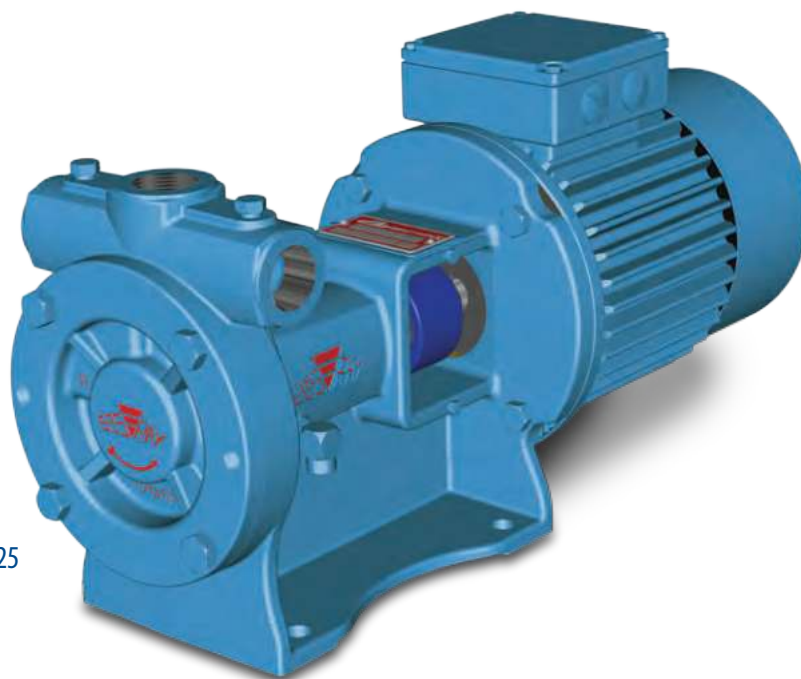


# PUMP

PUMP



## Ebsray RC Series – Models RC20 & RC25 Regenerative Turbine Pump for LPG Applications



Model RC25

### Design

The Ebsray RC Series Regenerative Turbine Pumps are designed and precision-built for high-pressure transfer of LPG, autogas, propane, and butane.

### Applications

- LPG Autogas dispensers, single or two hoses (RC25)
- Industrial dispensing
- Autogas refueling
- Marine dispensing
- Portable tanks
- Cylinder filling
- Forklift refueling
- Direct burner or vaporizer feed

### Features & Benefits

- Quiet, vibration-free operation
- Low maintenance, single-stage impeller
- Close coupled to standard NEMA C-face motors. IEC C-face adapters available.
- Simple installation with C-face close coupled mounting
- Versatile 3-port arrangement, self-venting design
- Bypass valve connection port direct on pump
- Balanced mechanical seal, unique cartridge design for simplicity of assembly/maintenance
- Throttle bushing for secondary sealing

### Assured Quality & Performance

ISO 9001 Quality System assures compliance with the high safety and quality standards demanded by the LPG industry

Pumps are listed by Underwriters Laboratories for LP-gas service.



# Ebsray RC Series – Models RC20 & RC25 Regenerative Turbine Pump for LPG Applications

## Maximum Operating Limits

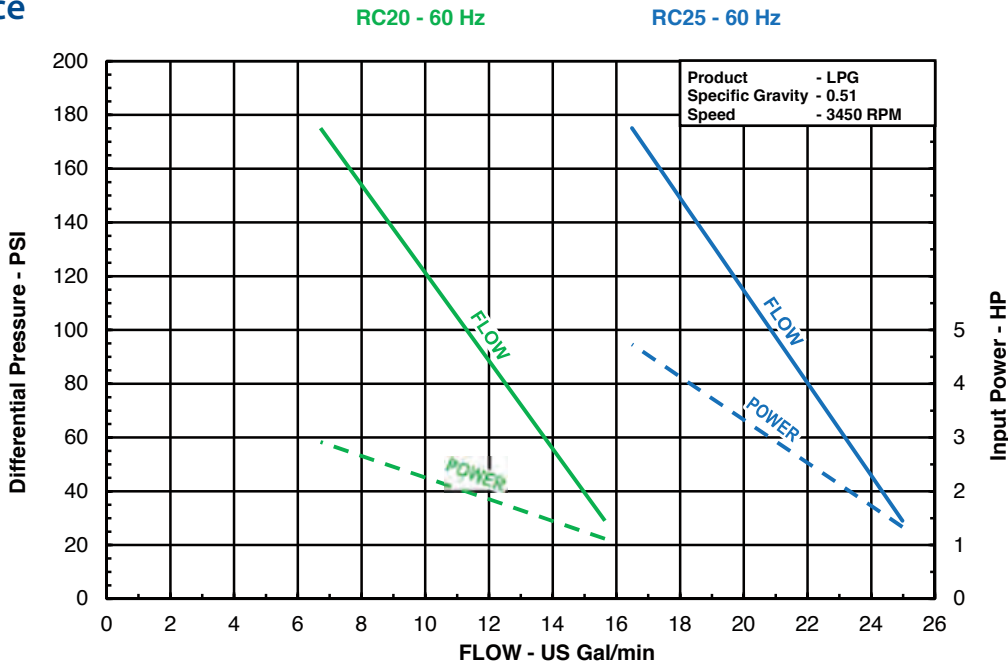
Pump Model	Flow Rate (at 3,500 rpm)		Differential Pressure (at 3,500 rpm)		Hydrostatic Test Pressure		Power		Pump Speed	Weight	
	gpm	L/min	psi	bar	psi	bar	HP	kW	rpm	lbs	kg
RC20	15	58	175	12	1,015	70	2.9	2.2	3,500	43	19.5
RC25	25	94	175	12	1,015	70	4.8	3.6	3,500	43	19.5

### Porting:

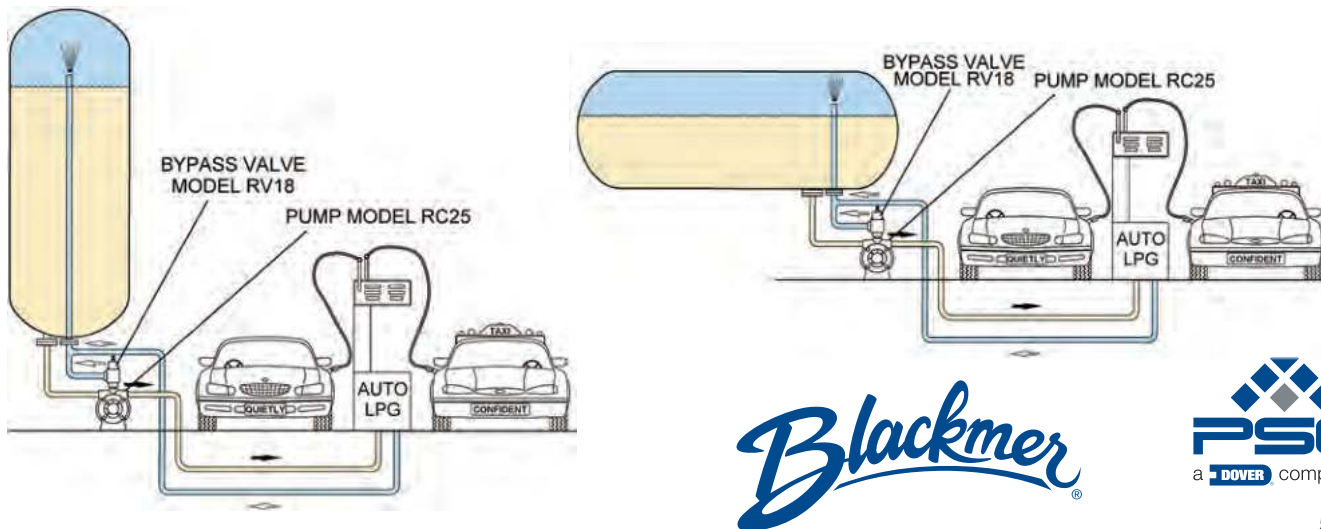
Inlet: NPT 1" 90° and/or 180°

Discharge: NPT 1" 90° and/or 180°

## Performance



## Typical Installations



# GAS EQUIPMENT COMPANY, Inc.

SINCE 1937



**Atlanta GA**  
(800) 241-4155  
**Kansas City MO**  
(800) 821-5062

**Dallas TX**  
(800) 821-1829  
**Little Rock AR**  
(800) 643-8222

**Fayetteville NC**  
(800) 447-1625  
**Orlando FL**  
(800) 821-0631

**Houston TX**  
(800) 334-7816  
**Richmond VA**  
(800) 368-4013

**Indianapolis IN**  
(800) 241-1971  
**St. Louis MO**  
(800) 423-4685

www.gasequipment.com

email: info@gasequipment.com

## Ebsray RV Series – Model RV18 Bypass Valve for LPG Applications



Model RV18

### Design

In-line design Bypass/Pressure Relief Valves are used for a wide variety of LPG services. Adjustable differential pressure is attained for accurate and repeatable performance in return-to-tank or bypass systems. This enables full pump flow while maintaining controlled preset maximum pressure.

### Features & Benefits

- CBS – Constant Bleed System
- Chatter-free quiet operation
- 90° porting arrangement
- 1" NPT tapped ports. 1" ANSI 300 flanged option.
- Adjustable pressure setting
- Low pressure rise
- VRS – Vapor Removal System

### Assured Quality & Performance

ISO9001 Quality System assures compliance with the high safety and quality standards demanded by the LPG industry

Pumps are listed by Underwriters Laboratories for LP-gas service.



# Ebsray RV Series – Model RV18

## Bypass Valve for LPG Applications

### Maximum Operating Limits

Pump Model	Flow Rate		Differential Pressure		Hydrostatic Test Pressure	
	gpm	L/min	psi	bar	psi	bar
RV18	52	200	203	14	1,015	70

#### Porting:

1" NPT tapped

- <sup>1</sup> Downstream system resistance will affect differential pressure.
- <sup>2</sup> Spring selection to suit required pressure range.
- <sup>3</sup> Pressure rise is dependent upon flow through Bypass Valve

**NOTE:** All specifications and illustrations are typical only and subject to revision without notice. Certified data available upon request.

#### ADJUSTING SCREW

- Easy access, simple to adjust
- Positive locking
- Leak free during adjustment

#### SEALING

- O-ring
- Simple to service

#### CASING

- Ductile iron to ASTM A395
- Assembled valve hydrostatically tested to 1,015 psi (70 bar)

#### SPRING

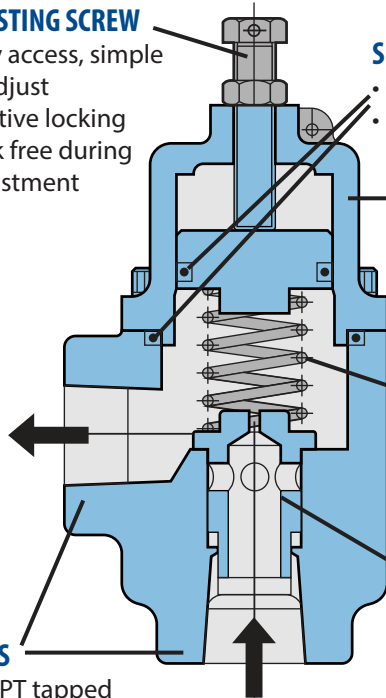
- Adjustable within spring pressure range <sup>1,2</sup>
- High quality spring steel

#### VALVE

- Spool type quiet operation
- CBS (Constant Bleed System) *Standard (optional VRS)*

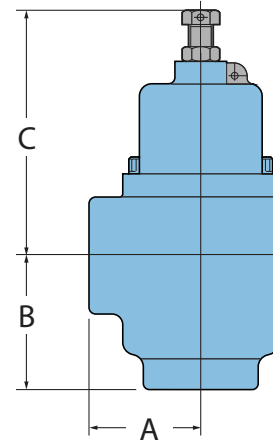
#### PORTS

- 1" NPT tapped
- Ease of installation service



### Dimensions

Pump Model	A	B	C	Ports	Weight	
RV18	in	2.17	2.6	5.3	1" NPT	13.9 lbs
	mm	55	66	135	Tapped	6.3 kg



### Optional

Integral "excess flow" type VRS. (Vapor Removal System)

- Rapid Vapor Clearing
- Efficiency – after vapor clearing is completed "excess flow" valve closes fully. This ensures full pump outlet is available at discharge point.
- Interchangeable with standard Spool Valve. (CBS)

#### VAPOR PATH

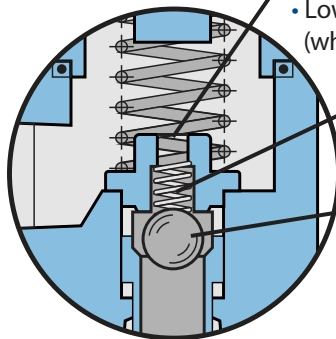
- Low Resistance (when in priming mode)

#### SPRING

- Stainless steel

#### BALL

- Non-metallic for quiet actuation and positive sealing



551-007



## GAS EQUIPMENT COMPANY, Inc.

SINCE 1937



**Atlanta GA**  
(800) 241-4155  
**Kansas City MO**  
(800) 821-5062

**Dallas TX**  
(800) 821-1829  
**Little Rock AR**  
(800) 643-8222

**Fayetteville NC**  
(800) 447-1625  
**Orlando FL**  
(800) 821-0631

**Houston TX**  
(800) 334-7816  
**Richmond VA**  
(800) 368-4013

**Indianapolis IN**  
(800) 241-1971  
**St. Louis MO**  
(800) 423-4685

[www.gasequipment.com](http://www.gasequipment.com)

email: [info@gasequipment.com](mailto:info@gasequipment.com)

# MOTOR / ELECTRIC

MOTOR / ELECTRIC





**LPG UNIT ELECTRICAL  
INSTALLATION GUIDELINES  
& NOTES**

Page Number	011-037
Effective	Feb 2012
Replaces	New
Section	011

Item 3.a.

This document is to serve as a guideline to assist in the installation, startup, and troubleshooting of the following pump and motor units – LGL1.25, LGL1.5 and LGL150 Series pumps. Only qualified personnel trained in the safe installation and operation of the equipment should install the unit. When connecting a unit to power please follow NEC (National Electric Code) and any other (country specific) local electrical codes that may apply during installation. Please verify all electrical information prior to startup of unit. This document is not intended to be used as a reference or authority for design, construction, or application of electrical systems.

**Motor Wire Sizing:**

Figure 1 contains a table of motor sizes and the respective recommended wire size depending upon the distance between the source and the load. As the distance increases from the source to the load, the voltage drops, caused by the resistance and reactance of a particular size of the wire. The wire must be sized properly to allow for this voltage drop to remain within an acceptable range. This is especially important for single phase motor applications. The following guidelines are minimums.

Recommended Motor Wiring						
Motor				Recommended Wire Size, AWG		
HP	Motor Phase	Voltage	Full Load Amperes	Length of Run in Feet		
				0-100	To 200	To 300
3	1	120	42.5	4	2	1/0
		240	21.25	10	8	6
	3	240	12	12	12	10
5	1	120	70	3	1/0	2/0
		240	35	8	6	4
	3	240	19	12	10	8
		480	9.5	12	12	12
7.5	3	240	27.5	10	8	6
		480	13.75	12	12	12

*Figure 1: Recommended Motor Wiring\**

\* Information collected from standard voltage drop calculator, with a 3% allowable decrease in voltage drop or less using standard conditions. For conditions other than listed, consult NEC handbook, local standards, or engineering handbook. Wire sizes are expressed in AWG (American Wire Gauge). For other distances consult the Blackmer factory.

**Phased Power:**

It is recommended to use three phase power where applicable. The three phase motor is a simpler design, more efficient by design, and also less costly than the single phase motor. The three phase motor allows for a higher starting torque, smoother operation, and allows the use of a smaller wire size over greater distances. Single phase power can be converted to three phase power by using a phase converter, which is readily available and inexpensive.

## System Design:

Systems shall be designed according to NFPA standards and local codes. It is recommended that a Blackmer manufactured bypass valve be used in the system as they are designed to allow the optimum system performance and stability. Below is a list of informational bulletins that also guide installation of a Blackmer pump and bypass valve.

Application Bulletin 500-001: Liquefied Gas Handbook

Installation, Operation, and Maintenance 501-K00: LGL150 Series Pumps

Installation, Operation, and Maintenance 501-B00: LGL1.25 & LGL1.5 Series Pumps

Installation, Operation, and Maintenance 505-A01, A02, A03: Bypass Valves



# SIEMENS

## NEMA Motor Data

Ordering data : 1MB2221-1CB11-4AA3

Client order no. :  
 Order no. :  
 Offer no. :  
 Remarks :

Item no. :  
 Consignment no. :  
 Project :

<b>Nameplate Data</b>	<b>Mounting and motor protection</b>
-----------------------	--------------------------------------

Type	XP100 ID1 - Class I, Group D, Division 1		
HP	3.0	Rating	Cont.
Voltage	(14) 208-230/460V STD	Ins. Class	Insulation class F
Amps	8.0 / 4.0 A	S.F.	1.15
FL RPM	1760	Amb. Temp.	55 deg C
FL Efficiency	89.5 %	Temp. Rise	Class B
FRAME	182T	kVA Code	K
DE AFBMA	30BC02JPP30	NEMA Des	B
ODE AFBMA	30BC02JPP30	Mtr WT	120
60 Hertz	3 Ph TEFC	IP	65

Type of construction	( A ) Foot mounted - End shield
Motor protection	(A) No winding protection
Terminal box design	(3) Mounting - F-1

Bearing Data		
	DE	ODE
Bearing Size	6206 ZZ C3 S0	6206 ZZ C3 S0
Bearing Type	Ball Bearing	Ball Bearing
AFBMA	30BC02JPP30	30BC02JPP30

Typical Performance Data					
--------------------------	--	--	--	--	--

Load	No Load	1/2	3/4	Full Load	LRC
Efficiency		87.8 %	89.4 %	89.5 %	
Power Factor		59.5	71.7	78.5	
Current (A)	2.1 A	2.7 A	3.3 A	8.0 / 4.0 A	33.0 A
Inverter Duty	VT	20:1	CT	4:1	

Mechanical Data			
-----------------	--	--	--

SAFE STALL TIME	HOT (s)	17	COLD (s)	29
Rtr wt (lbs)	23.7	Rtr WK2	0.3000	
FLT (ft-lbs)	9.0	LRT	21.0	BDT 32.0
Ext Load Inertia (WK2) Capability	17.0			

Typical Noise Data									
--------------------	--	--	--	--	--	--	--	--	--

A-weighted Sound	Octave Band Center Frequencies Hertz (Hz)									
Pressure Level	63	125	250	500	1000	2000	4000	8000	SPL	63
at 3 feet		33	51	54	60	58	48	39	SPwrL	72

Wiring Connection Information				
-------------------------------	--	--	--	--

Description	3 PHASE - 9 LEAD - WYE			
Voltage	L1	L2	L3	Connected together
LOW	T1 T7	T2 T8	T3 T9	T4 T5 T6 Y Y
HIGH	T1	T2	T3	T4 T7-T5 T8-T6 T9 Y

Special design :
------------------

Lubrication Information	
-------------------------	--

Manufacturer	Mobil Polyrex EM or equal
Type	Polyurea (standard)
DE Capacity (oz.)	0.20
ODEnd Capacity (oz.)	0.20

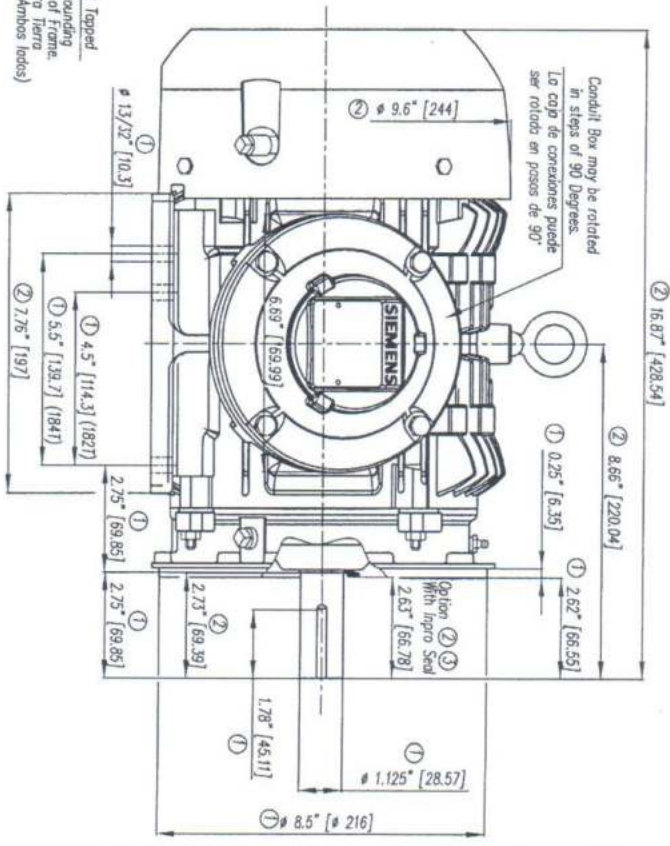
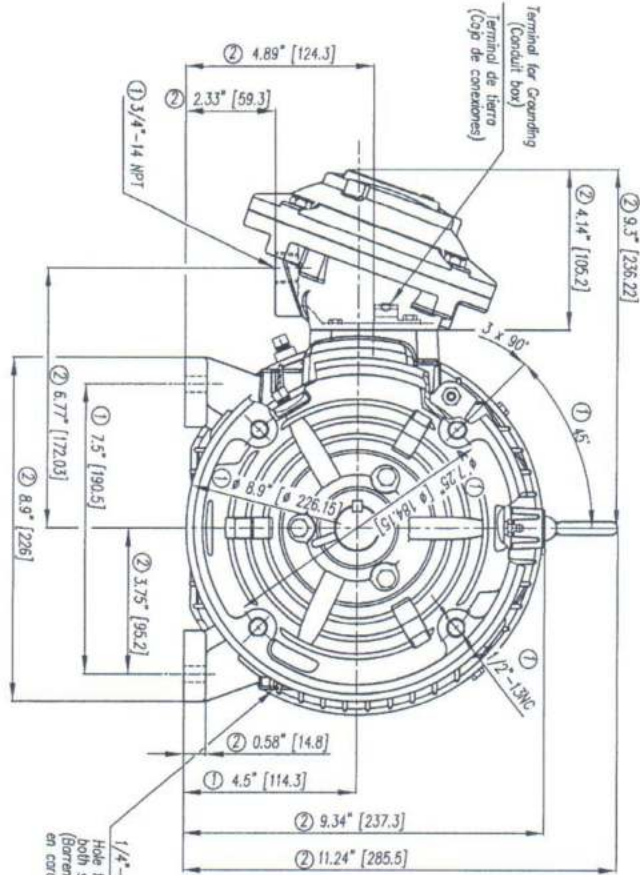
Relubricate bearings every six months (more frequent if conditions require). See Instruction Manual.

Technical data are subject to change! There may be discrepancies between calculated and rating plate values.

This document reproduction, as well as the communication of this content are illicit, except for written consent from SIEMENS. All rights are reserved for the case of patent concession of invention or industrial model register.

La reproducción de este documento, así como la comunicación de su contenido son ilícitos, salvo consentimiento expreso. Se reservan todos los derechos para el caso de la concesión de patente de invención o registro de modelo industrial.

F260/1-0310

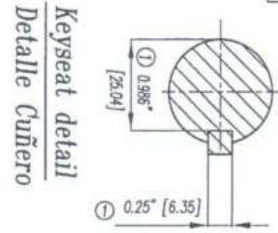


- ① Tolerances According to NEMA Std.
- ② All these dimensions corresponding to assemblies and castings shall have a tolerance as per DIN standard 1898-G18-19.
- ③ Not According to NEMA Std.

- ① Tolerancias acorde a NEMA Std.
- ② Todos estas dimensiones correspondientes a ensambles y fundición en bruto tendrán una tolerancia según DIN 1898-G18-19.
- ③ No acorde a NEMA Std.

**CERTIFIED PRINT / CERTIFICACION**

DIMENSIONES		DIMENSIONES		DIMENSIONES	
PROYECTISTA	REVISOR	PROYECTISTA	REVISOR	PROYECTISTA	REVISOR



Tol. in mm, acc. to Tol. en mm, según DIN-1898-G18-19	18	± 4.5	30	± 4.7
Over/desde For/hasta	30	± 5	50	± 5.5
	50	± 6	80	± 6.5
	80	± 7	120	± 7.5
	120	± 8	180	± 8.5
	180	± 9.5	250	± 10
	250	± 10	315	± 11
	315	± 11	400	± 12
	400	± 12	500	± 13
	500	± 13	630	± 14
	630	± 14	800	± 15

European Projection/Projection Europea	Modific.
Dim. in inches/Dim. en pulg.	
Date/fecha	Name/Nombre
15/06/10	F. LOPEZ
Drawn/Elab.	Rev./Revisión
09/08/10	1
SIEMENS	
GUADALAJARA FACTORY	
FABRICA GUADALAJARA	
Rel.	
3MSE 211 0559	
Scale/Escala	
1:1	

File E120739  
Project 09NK16907

January 24, 2011

REPORT

on

Motors for Use in Hazardous Locations

Siemens S A De C V  
Guadalajara, Mexico

Copyright © 2011 Underwriters Laboratories Inc.

Underwriters Laboratories Inc. authorizes the above named company to reproduce  
this Report provided it is in its entirety.

DESCRIPTION

PRODUCT COVERED:

USL, CNL XP100 Series Electric motors for use in Hazardous Locations, Class I, Groups C and D; Class II, Groups E, F, and G, Frame sizes 143, 145, 182, 184, 213, 215.

USL, CNL XP100 ID1 Series Electric motors for use in Hazardous Locations, Class I, Group D, Frame sizes 143, 145, 182, 184, 213, 215.

Motors are followed by suffixes T, TC, or TZ which denote length of shaft or length of shaft and flange design, respectively.

GENERAL:

These motors are squirrel cage TEFC electric motors for use in hazardous locations. The XP100 ID1 Series motors are identical to the XP100 Series motors except that they are provided without temperature limiting devices. Ratings and Markings differences are detailed in the description below.

RATINGS:

Maximum Horsepower	See Table 1 below
Maximum rpm	3600
Number of poles	2, 4, 6, 8
Service Factor	1.0 and 1.15 on sinusoidal power 1.0 on inverter power
Duty Rating	Continuous
Insulation Class	When marked Class F on nameplate, lead wires are Class F and the remaining components are Class H When marked Class H on nameplate, all components are Class H
Temperature Rise By Resistance	80°C by resistance
Ambient Temperature Rating	XP100 Series - 40°C XP100 ID1 Series - 60°C Maximum
Operating Temperature or Operating Temperature Code (External Surfaces)	T3C when motor has temperature limiting devices installed T2A when motor has no temperature limiting devices
Maximum Voltage Rating	600

# EFS Non-Sealed Tumbler Switches

## Explosionproof, Dust-Ignitionproof

Malleable Iron Body and Cover. Furnished with Internal Ground Screw.

Class I, Division 1 and 2, Groups C, D  
 Class II, Division 1 and 2, Groups E, F, G  
 Class III  
 NEMA 7CD, 9EFG

Controls

CONTROLS: HAZARDOUS LOCATION CONTROL STATIONS AND SWITCHES

### Applications

- Designed to prevent arcing of enclosed switches in ignitable atmospheres during connect and disconnect operation of lighting and light power loads.
- For use in classified areas where ignitable vapors, gases or highly combustible dusts are present.
- For installation in:
  - Chemical plants
  - Petrochemical plants
  - Refineries
  - Other process industries

### Features

- Enclosures have external mounting lugs for ease of mounting.
- Smooth, rounded integral bushing in each hub protects conductor insulation.
- Enclosures furnished with internal ground screw.
- 20 Amp and 30 Amp units available for use with 120-277 Vac.
- Smooth ground mating surfaces assure flame-tight joint between cover and mounting enclosure.
- Stainless steel hex head cap screws for attaching cover to mounting enclosure.
- Choice of front-operating or side rocker arm handle—each may be locked in ON or OFF position.
- Each handle has close-tolerance threaded stainless steel shaft to meet explosionproof requirements.
- Enclosures furnished with internal ground screw.

### Options

- 1- or 2-gang copperfree (4/10 of 1% max.) aluminum bodies and covers available. Add suffix -A.
- NPBRKT nameplate mounting bracket to make circuit description/identification easy.
  - Pre-drilled holes in bottom of bracket allow direct mounting to control stations with existing cover bolts.
  - Pre-drilled holes in middle of bracket allow mounting of customer's circuit identification nameplate; epoxy glue may also be used for mounting (phenolic nameplate not included).
  - Bracket eliminates costly field installation of drilling and tapping to accommodate circuit identification nameplate.
  - Brackets fit side-by-side on 2-, 3- and 4-gang boxes and 3-devices.

### Standard Materials

- Body and cover: malleable iron
- Handle: nylon 6/6
- Optional nameplate mounting bracket: corrosion resistant stainless steel

### Standard Finishes

- Tumbler switch body: triple-coat—(1) zinc electroplate, (2) chromate, and (3) epoxy powder coat

### Certifications and Compliances

- UL Standards: UL 894, UL 1203
- UL Listed: E10523, E81751

### Ordering Information for "Custom" Units

- Devices, covers and bodies may be ordered separately so that a different EFS switch may be used in each gang.
- Order components separately as follows:
  - (1) select body catalog number,



Front Operated



Rocker Arm Operated

### Illustrated Features



Handles may be locked in ON or OFF position

- (2) select cover catalog number, and
- (3) select switch or switch assembly catalog number (1-pole, 2-pole, 3-way or 4-way available in listings).

### How to Order Hub Arrangements

- Simply send sketch indicating sizes and locations for brazed hubs on body or bodies selected from catalog listings. Orient sketch so that cover opening faces front and mounting lugs face upward and downward (box wall opposite cover should be referred to as the *back* of box).

### Bodies and Hubs Available

- Tumbler switches may be ordered in single thru five gang deep malleable iron blank bodies with brazed hubs as specified at any location.
- Tumbler switches may be ordered with tandem malleable iron boxes with additional brazed hubs as specified.
- Standard malleable iron single and 2-gang tumbler switches may be ordered with additional brazed hubs as specified.
- Single and 2-gang tumbler switches may be ordered with aluminum boxes with additional brazed hubs as specified.

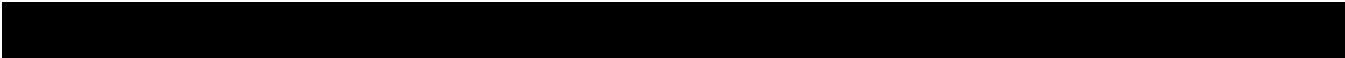
### Related Products

- For classified-location push button, pilot light and selector switch control stations, see *Explosionproof Control Stations Section*.

TS-510  
Rev. B  
Mechanical Flowmeter Transmitters  
Digital: Models VR and VRHR



# ELECTRONIC DIGITAL PULSE TRANSMITTERS FOR MECHANICAL FLOWMETERS



## DIGITAL TRANSMITTERS

Digital transmitters produce signals that exist only in one of two states: ON or OFF. These states may also be referred to as HIGH or LOW, or 1 or 0 (zero).

### MODEL VR7697 (Models 35 & 45)

This economical and versatile bidirectional digital pulse

transmitter provides 10 pulses per revolution with excitation power of 115-250 VAC or 12-36 VDC, making it compatible with most remote read-out equipment.

### MODEL VR7671 (HR) (Models 35 HR & 45 HR)

This solid state Hall Effect digital pulse transmitter provides 100 pulses per revolution. Note that input (excitation) power is limited to 10-15 VDC.

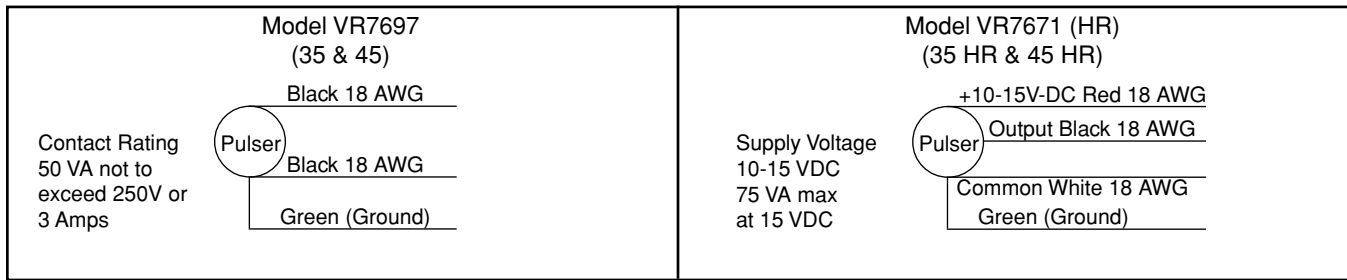
## NEPTUNE DIGITAL PULSE ELECTRONIC TRANSMITTER DATA

Model No.	Type Of Device	Contact	Pulses per Revolution	Max Speed: Hz (RPM) (2)	Contact Rating (2)	Enclosure Rating	Input Voltage	Remarks
VR7697	Dry Reed Bi-directional	SP/ST	10	50 (300)	50 VA resistive (not to exceed 250v or 3 amp)	U.L., CSA X-proof Class I, Div 1 Groups C&D	110 & 250 VAC 12-36 VDC	Models 35 and 45
VR7671 (HR)	Hall Effect Uni-directional	Solid State	100	1000 (600)	.75 VA max. non-inductive (not to exceed 15VDC or .05A)	U.L., CSA X-proof Class 1, Div. 1 Groups C&D	10-15 VDC	Models 35 HR and 45 HR

Notes:

- (1) All above units are compatible with Batchmate 1500 Solid State Controller (see TS 500)
- (2) a. Max speed in pulses per revolution, Hz, and RPM limits from Manufacturers' data

## WIRING DIAGRAMS

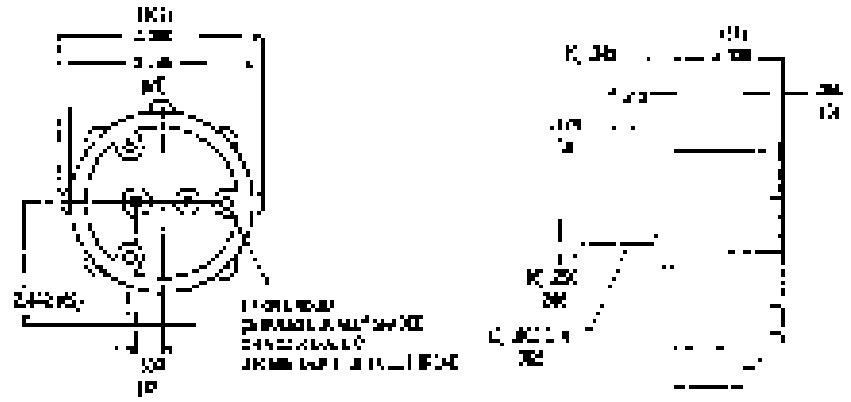


### NEPTUNE ELECTRONIC TRANSMITTER Operating and Storage Temperature Data

Model No.		VR7697 (35 & 45)	VR 7671 (HR) (35 HR & 45 HR)
<b>Environment</b>			
<b>Operating</b>	°C	-40 to +71	-40 to +82
	°F	<b>-40 to +160</b>	<b>-40 to +180</b>
<b>Storage</b>	°C		-55 to +125
	°F		<b>-67 to +257</b>

## DIMENSIONS in (mm)

### Model VR7697 & VR7671 (HR) (35 & 45) (35 HR & 45 HR)



## CURRENT SOURCING -vs- CURRENT SINKING

**Current Sourcing:** sensor supplies the voltage to the count input. Sourcing sensors are PNP transistor outputs or a contact closure to V+.

**Current Sinking:** sensor provides a path to DC common for the count input. Sinking sensors are NPN transistor outputs or a contact closure to DC common.

**Compatibility:** Both sourcing and sinking digital pulse transmitters offered by Neptune are fully compatible with the Neptune BATCHMATE 1500™ electronic batch controllers, which can be set by DIP switches in the device at the factory or in the field to match the transmitter.



**U.S.A./International**  
1310 Emerald Road  
Greenwood, SC 29646-9558  
Tel.: Toll-Free (800) 833-3357  
(864) 223-1212  
Fax: (864) 223-0341

© 2005 Actaris U.S. Liquid Measurement, Inc. 400 5/05  
Specifications subject to change without prior notification.



# METER



METER



M-285  
Rev. H  
P.D. Oscillating Piston Flowmeter  
1" 4D-MD LP Gas

# RED SEAL MEASUREMENT

## Operating and Maintenance Manual LPG



## 4D-MD LP-GAS COMPACT FLOWMETERS

### GENERAL INFORMATION

This manual covers the installation and maintenance of the Type 4D-MD LP-Gas Compact Flowmeter (Figure 1) which includes a Strainer, Vapor Release, Differential Valve and Automatic Temperature Compensator.

The housing and pressure components of the 4D-MD are constructed of A356 aluminum with T6 heat treatment. Nominal line connections of 3/4" and 1" (ductile iron connections) are available. The meter is fully rated to 350 psi and has been approved by UL.

The strainer, housed in the Vapor Release at the intake of the flowmeter, is of a fine (either an 80-84 mesh or special 30 micron) mesh double sleeve construction with O-rings for positive sealing. It is accessible by removing the strainer cover.

The Vapor Release, which prevents entrapped vapor from passing through the flowmeter, has a float-operated valve. When vapor collects in the Vapor Release, the valve opens venting vapor to the supply tank establishing pump pressure to close the Differential Valve. The vapor release employs a sleeve-type valve that permits a constant "leak" flow of approximately 0.2 gpm from the vapor vent back to the supply tank.

The Differential Valve is piston, plug type construction and opens when at least 15-psi pump pressure is established. This valve serves three functions to assure system measurement accuracy by requiring: (1) pump operation for delivery, (2) adequate back pressure to prevent product vaporization during measurement, and (3) blockage of flow when the Vapor Release valve opens.

The type 4D-MD is available with outlet/inlet flanges of 3/4" and 1" diameters to permit connection to varying pipe dimensions. Please refer to the current price list or your RSM distributor for additional information.

The optional temperature compensator, by sensing product temperature, controls the readout drive ratio to provide a registration compensated by 15°C (60°F).

The Type 4D-MD is available with a choice of 600 or 800 Series mechanical resettable totalizing registers. Pulse output is also optionally available.

The recommended temperature range for operation of the 4D-MD is -23° to 60°C (-10° to 140°F) or -23°C to 52°C (-10° to 125°F) for automatic temperature compensator equipped meter.

### INSTALLATION

1. Plan the installation for maximum rate of delivery, sizing the supply tank outlet, piping and valve for free gravity flow to the pump suction. To accomplish this, locate the pump as close as possible to the supply tank and use short inlet connections with few restrictions. Keep the number of elbows to a minimum, and use large radius elbows, wherever possible. To further reduce the likelihood of causing vapor in the pump suction line, install a pump bypass valve in a return line to the supply tank as shown in the installation drawing. (See Figure 2).
2. Locate the flowmeter at any convenient place in the pump discharge line. If the flowmeter is to be operated under extremes of environment (dirt, water, physical damage, etc.), an enclosure or other protection should be provided. Allow sufficient clearances for removal of the register, strainer and vapor release as shown in Figure 14. **Do not install any bypass around the flowmeter;** the valve in such a line might eventually leak, work open, or be left open causing improper measurement.

To conform with Weights and Measures requirements, install flowmeter so that the **flowmeter** nameplate is visible.

#### NOTE

All piping on the inlet side of the flowmeter should be very thoroughly cleaned out. Flush out all lines thoroughly before installing the flowmeter.

While the installation is still new, the strainer should be cleaned once per month minimally for the first three (3) months. After the system has been thoroughly flushed of foreign material, only periodic (minimum annually) cleaning is recommended.

*The majority of service calls on new installations would be eliminated if these directions were followed.*

### GENERAL INFORMATION

### INSTALLATION Before Installing the Flowmeter



**RED SEAL  
MEASUREMENT**

TS-285(G)

# TYPE 4D-MD L.P. GAS FLOWMETER 1" ALUMINUM BODY DISPENSER METER

## DESCRIPTION

The Red Seal 1" Type 4D-MD meter, with double case design has been specifically designed for the custody transfer of liquefied propane and butane gas (LPG). This meter utilizes the oscillating piston positive displacement measuring chamber technology. The 1" Type 4D-MD is particularly suited for filling portable gas bottled and fuel containers for portable burners, pavement heaters, weed burners, fork lift trucks and motor fuel tanks.

The standard unit includes the base meter with the choice of either a 600 Series totalizing register with a resettable counter or an 800 Series printer register. A differential control valve, combination vapor eliminator/strainer, continuous bleed pressure relief valve and tubing kit are also included. An optional automatic temperature compensator (ATC) is available. The ATC senses product temperature and adjusts the readout to result in registration that is compensated to 15°C (60°F).

## DESIGN FEATURES

### SUPERIOR ACCURACY

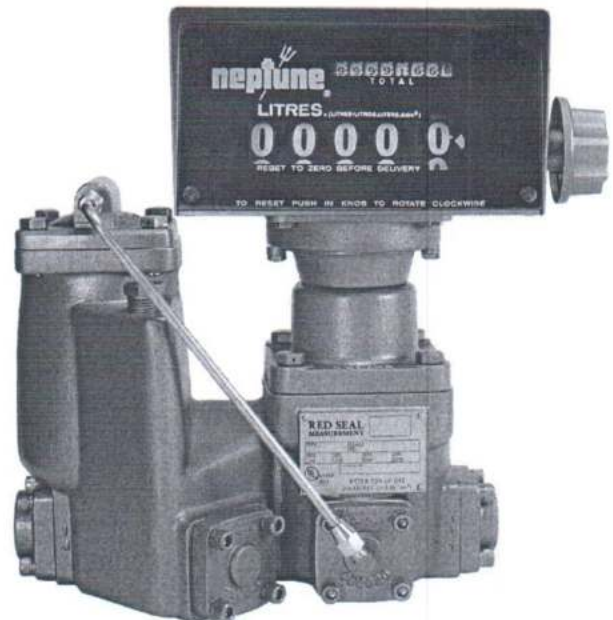
The Neptune designed oscillating piston measuring chamber is both accurate and reliable. The piston is treated with a special coating which protects it from damage by impurities and adds lubricity for smooth performance at low flow and high operating pressures.

### FLEXIBILITY

Rugged outer body components in a compact design make the 1" Type 4D-MD useable in a wide variety of installation configurations. The meter is also available with several different register options, and in temperature compensated and uncompensated versions.

### UNITS OF MEASURE

Neptune 600 and 800 Series registers offer a full range of options for calibration in U.S. gallons, Litres and Imperial gallons, with 5 digit reset and an 8 digit non-resettable totalizer.



1" 4D-MD with 600 Series Register

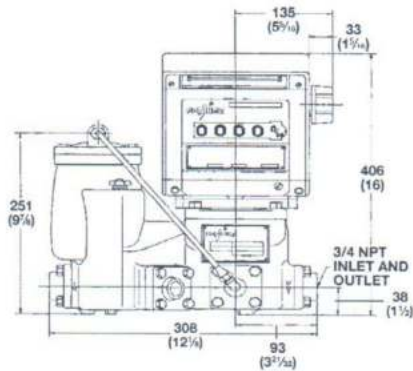
## OPERATING SPECIFICATIONS

<b>Flow Rate</b>	<b>LPM</b>	<b>US Gal./Min.</b>
Maximum	68	18
Minimum	11	3
<b>Operating Pressure</b>	<b>Bars</b>	<b>PSI</b>
Maximum	24	350
Minimum		See Note
<b>Operating Temperature (without ATC)</b>	<b>°C</b>	<b>°F</b>
Maximum	60	140
Minimum	-23	-10
<b>Temperature Compensation (ATC)</b>		
Compensates to a basepoint of 15°C (60°F)		
Range: -23°C to 52°C (-10°F to 125°F)		
<b>Connections</b>		
Ductile iron companion flange tapped for 3/4" std. pipe		
Optional ductile iron companion flange tapped for 1" std. pipe		

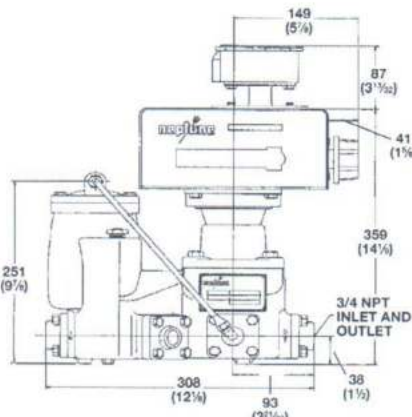
Note: A minimum of 1.034 bars (15 psi) is needed to open the differential control valve, plus pressure loss in the system.

**DIMENSIONAL DATA, mm (in.)**

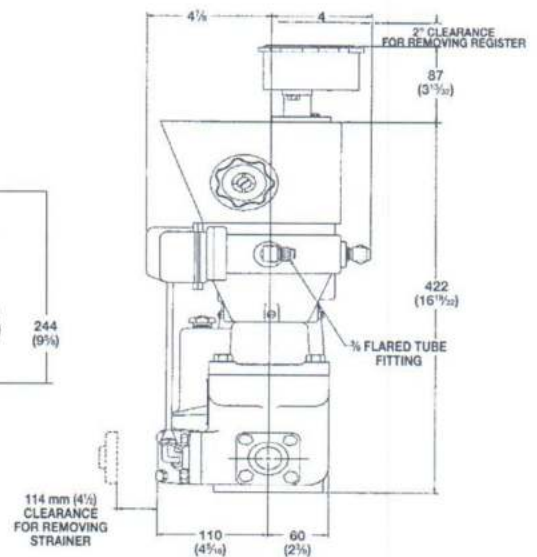
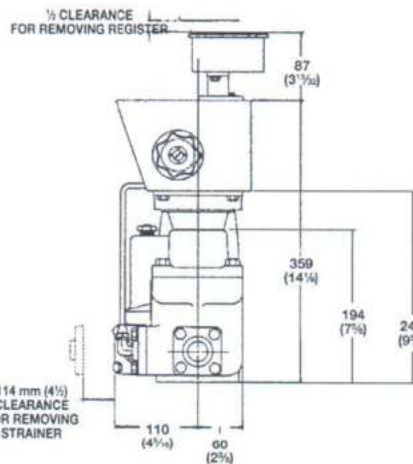
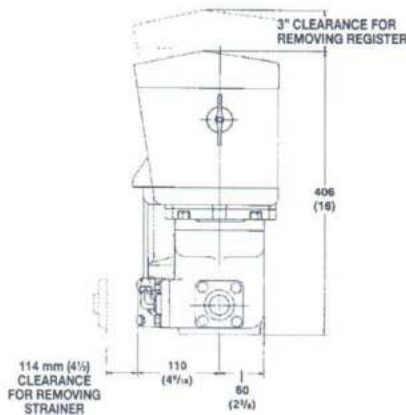
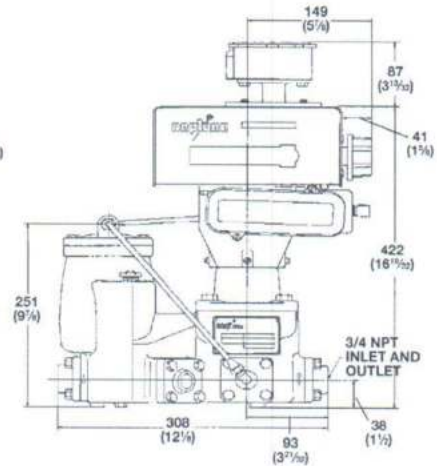
**1" 4D-MD with 800 Series Register**



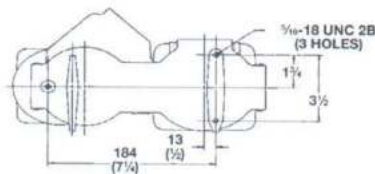
**1" 4D-MD with 600 Series Register**



**1" 4D-MD with 600 Series Register and ATC**



**Bottom View All Configurations**



**Specify Genuine Neptune Replacement Parts**

Accuracy of all Neptune Type 4D Custody Transfer Meters for use with L.P. Gas and Butane meets or exceeds N.I.S.T. Handbook 44 Parameters.

1310 Emerald Road  
Greenwood, SC 29646  
USA  
Phone: 1.800.833.3357  
Fax: 1.864.223.0341



# VALVES



VALVES

# CERTIFICATE



This is to certify that

## Engineered Controls International, LLC

100 Rego Drive  
Elon, NC 27244  
United States of America

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System.**

**Scope:**

The design and manufacture of valves, regulators and fittings for the L.P. Gas, Anhydrous Ammonia, LNG, and Compressed Gas Industries.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

### ISO 9001 : 2008

Certificate registration no.	10001523 QM08
Date of original certification	1994-10-04
Date of revision	2013-12-08
Date of certification	2012-12-22
Valid until	2015-12-21



#### UL DQS Inc.

Ganesh Rao  
Managing Director

Accredited Body: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA



**Annex to Certificate  
Registration No. 10001523 QM08**

**Engineered Controls International, LLC**

100 Rego Drive  
Elon, NC 27244  
United States of America

**Location**

**10003889**  
**Engineered Controls International, LLC**  
**3181 Lear Drive**  
**Burlington, NC 27215**  
**United States of America**

**10003890**  
**Engineered Controls International, LLC**  
**911 Industrial Drive S.W.**  
**Conover, NC 28613**  
**United States of America**



This annex (edition: 2013-12-08) is only valid in connection with the above-mentioned certificate.

## LP-Gas Excess Flow Valves

### Safety Warnings



#### Purpose

In its continuing quest for safety, REGO® publishes a series of bulletins explaining the hazards associated with the use, misuse, and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel, that the utmost care and attention must be used in the installation, inspection, and maintenance of these products, or problems could occur which would result in injuries and property damage.

The National Fire Protection Association NFPA 58 Liquefied Petroleum Gas Code - 2014 Edition states in Section 4 Qualification of Personnel; "Persons whose duties fall within the scope of this code shall be provided with training that is consistent with the scope of their job activities and that includes proper handling and emergency response procedures... Refresher training shall be provided at least every 3 years, initial and subsequent training shall be documented". These "RegO® Safety Warnings" may be useful in training new employees and reminding older employees of hazards that can occur. It is recommended that all employees complete the Propane Education Research Council's Certified Employee Training Program.

### Nature of Warnings

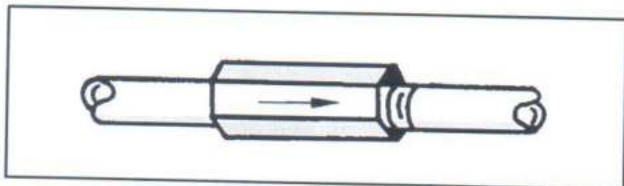
It is recognized that warnings should be as brief as possible, but the factors involved in excess flow valve failures to perform are not simple. They need to be fully understood. If there is a simple warning, it would be:

**Make sure that the excess flow valve really closes when the flow exceeds normal transfer flow.**

This bulletin is not intended to be an exhaustive treatment of excess flow valves, and certainly does not cover all safety practices that should be followed in installation, operation and maintenance of LP-Gas systems which include excess flow valves.

### Selection and Installation

The selection of a given closing rating of an excess flow valve involves an analysis of the complete piping system and is beyond the scope of this bulletin.



It is sufficient to say that an excess flow valve must be installed in the correct direction and will close only if the flow of liquid or vapor exceeds its designed closing rating. Many valves have been installed with closing ratings considerably higher than any flow that could be obtained by a downstream rupture in piping or hoses and thus give none of the protection for which they are intended.

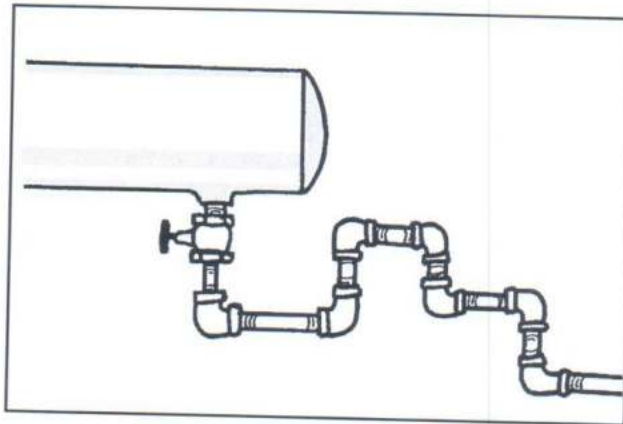
REGO® provides excess flow valves with a number of closing ratings. REGO® obviously can take no responsibility for the proper selection or correct installation of any valve.

Excess flow valves do not provide complete shut-off because there is a bleed at the check to permit pressure equalization.

### Causes of Failure to Close

Installers, LP-Gas plant managers and service personnel should be aware that the excess flow valves may not close if these conditions are present.

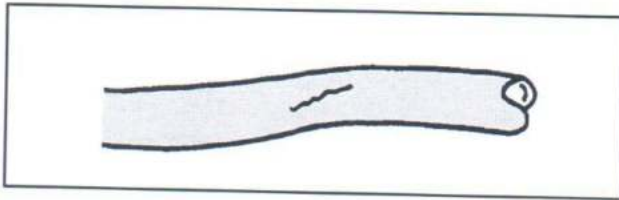
1. The piping system restrictions (due to pipe length, branches, reduction in pipe size or number of other valves) decrease the flow rate to less than the valve's closing flow.



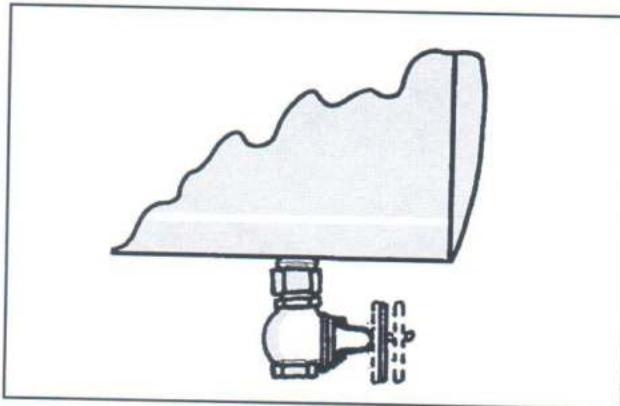


## LP-Gas Excess Flow Valves

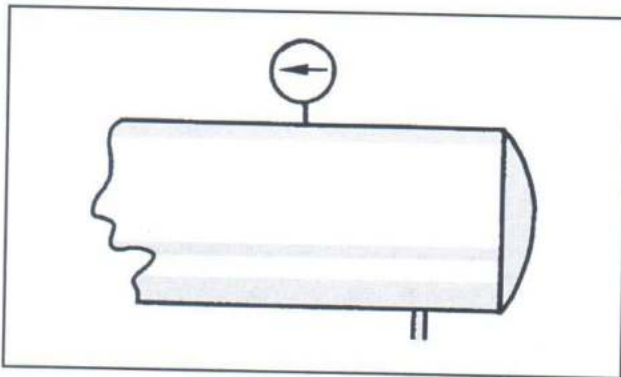
2. The break or damage to the downstream line is not large enough to allow enough flow to close the valve.



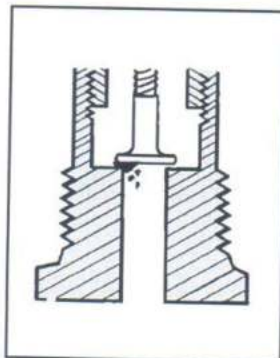
3. A shut-off valve in the line is only partially open and will not allow enough flow to close the excess flow valve.



4. LP-Gas pressure upstream of the excess flow valve, particularly due to low temperature, is not high enough to produce a closing flow rate.



5. Foreign matter (such as welding slag, scale or sludge) is lodged in the valve and prevents closing.



Because of these limitations, it is good industry practice to NOT rely entirely on excess flow valves for protection. Installation of emergency shut-off valves with remote controls is recommended in addition to excess flow valves.

### Testing

The National Propane Gas Association Safety Bulletin #113-78 states:

"In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating. This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained. The exact procedure used may vary with the installation, advisability of gas discharge and availability of equipment.

In general, most testing makes use of the fact that excess flow valves are "surge sensitive" and will close quicker under a sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick open/close valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

A test involving venting gas to the atmosphere is hazardous and may be impractical, or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valve's condition, and the flow rate sizing for those test conditions."

### General Warning

All REGO® products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber.

The environment and conditions of use will determine the safe service life of these products. Periodic testing at least once a year when tank pressures are low and maintenance, as required, are essential.

Because REGO® products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because an excess flow valve is used beyond its safe service life. Life of an excess flow valve is determined by the environment in which it "lives". The LPGas dealer knows better than anyone what this environment is.

NOTE: There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LPGas dealers should be aware of legislation which could effect them.

# Excess Flow Valves

## General Information

RegO® Excess Flow Valves have been designed, developed, and manufactured for a wide variety of industry needs for more than three decades.

Throughout the years, those concerned with installing and operating bulk plant facilities have looked to RegO® products with confidence for reliable, long-lasting valves as required by the National Fire Protection Association (NFPA) Standards 58 and 59, as well as any state, provincial, and local regulations.

It is a responsibility we have not taken lightly. RegO® products continue to not only assess the most effective designs, but anticipate and meet the industry's changing requirements. Toward that goal, RegO® products include over fifty different types and sizes of excess flow valves (most of which are listed by Underwriters Laboratories) to meet the needs of the LP-Gas and anhydrous ammonia industries.

## An Explanation and Warning

An excess flow valve is a spring-loaded check valve which will close only when the flow of fluid through the valve generates sufficient force to overcome the power of the spring holding it open. Each valve has a closing rating in gallons per minute and CFH/air.

The selection of a proper closing rating is critical. It requires a technical understanding of the flow characteristics of the piping system, including restrictions of the piping and other valves and fittings downstream of the excess flow valve.

System designers and operating people must understand why an excess flow valve, which remains open in normal operations, may fail to close when an accident occurs.

**Warning: A downstream break in piping or hoses may not result in sufficient flow to close the valve.**

## How They Work

Excess flow valves permit the flow of liquid or vapor in either direction. This flow is controlled in only one direction (the direction of the arrow stamped on the valve). If the flow in that direction exceeds a predetermined rate (shown in this catalog for each valve), the valve automatically closes.

The valve disc is held in the open position by a spring. When the flow creates a pressure drop across the valve disc that overcomes the preset load on the spring, the valve disc moves to the closed position. It remains closed until the force on both sides of the valve disc are approximately equal (a small bleed hole in the disc of each valve permits equalization), then the spring automatically reopens the valve. When a line is completely broken, the pressure cannot equalize and the excess flow valve remains closed until the line is repaired. Because the bleed hole in each valve disc permits equalization of pressure, excess flow valves do not provide a 100 percent type shut-off.

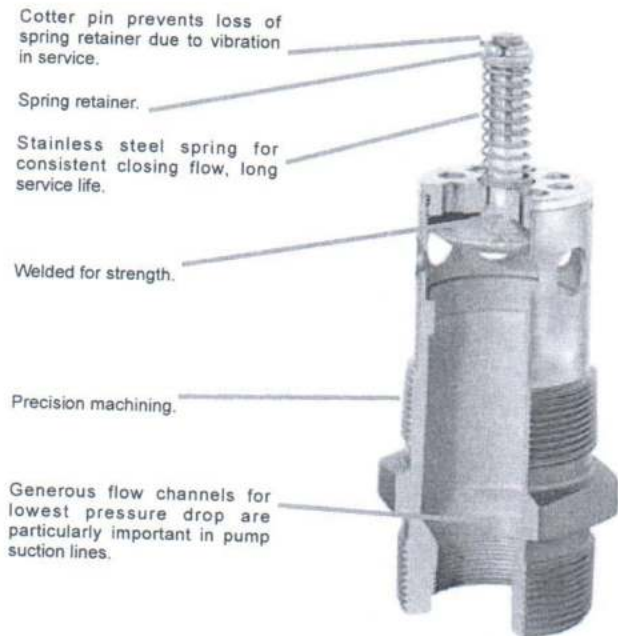
## Proper Installation

Since excess flow valves depend on flow in order to close, the line downstream of the excess flow valve should be large enough not to excessively restrict the flow. If the piping is too small, unusually long or restricted by too many elbows, tees and other fittings, consideration should be given to the use of larger size pipe fittings.

An excess flow valve in a pump suction line cannot be expected to close in the case of a clean break in the line beyond the pump, as the pump constitutes too great a restriction, even if running.

Good piping practices dictate the selection of an excess flow valve with a rated closing flow of approximately 50 percent greater than the anticipated normal flow. This is important because valves which have a rated closing flow very close to the normal flow may chatter or slug closed when surges in the line occur during normal operation, or due to the rapid opening of a control valve.

All installations must be in accordance with NFPA Standards 58 and 59, as well as state, provincial and local regulations.



## The Limitations of Excess Check Valves for LP-Gas

Excess flow check valves have been of help in limiting gas loss in many incidents involving breakage of hoses and transfer piping. Thus, they do provide a useful safety function in LP-Gas systems. However, there have also been transfer system accidents where excess flow valves have been ineffective in controlling gas loss due to a variety of conditions and to the inherent limitations of these valves. This bulletin explains what protection excess flow valves can offer, points out conditions which can interfere with that protection, and offers suggestions for effective excess flow valve installation.

An excess flow valve is a protective device to help control the discharge of product in the event of complete breakage of pipe lines or hose rupture. However, an excess flow valve can only offer limited protection from gas discharge, because it will only close under those conditions which cause the flow through the valve to exceed its rated closing flow, and even when closed it necessarily allows some "bleed" past the valve.

**An excess flow valve is not designed to close and thus may not provide protection, if any of the following conditions are present:**

1. The piping system restrictions (due to pipe length, branches, reduction in pipe size, or number of other valves) decrease the flow rate to less than the valve's closing flow. (Valve should be selected by closing flow rating — not just by pipe size).
2. The break or damage to the downstream line is not large enough to allow enough flow to close the valve.
3. A shut-off valve in the line is only partially open and will not allow enough flow to close the excess flow valve.
4. LP-Gas pressure upstream of the excess flow valve, particularly due to low temperature, is not high enough to produce a closing flow rate.
5. Foreign matter (such as welding slag) is lodged in the valve and prevents its closing.
6. A buildup of process material (sludge), which may be found in LPGas, may occur over a period of time and cause the valve to stick open.
7. The piping break or damage occurs upstream of an in-line excess flow valve, so the escaping product is not passing through the valve.
8. The flow through the valve is in the wrong direction. (Excess flow valves only respond to flow in one direction.)
9. The excess flow valve has been damaged, or is otherwise not in operating condition.

Because of these limitations of excess flow valves, they should not be relied upon as the only means of controlling the escape of product in the event of piping damage. When possible, shut-off protection by quick closing valves, with shut-off controls accessible in spite of likely line damage, should be provided in addition to, or instead of excess flow valves.

**Where excess flow valves are installed, they should be checked to see that:**

1. They are installed in the correct direction — the arrow on the valve indicates the shut-off direction.
2. The flow rating on the valve is proper for the installation. The rating must be above the normal system flow, but not higher than necessary to prevent "nuisance" closing in normal conditions. If the manufacturer's catalog information is not sufficient, the valve suppliers can provide sizing assistance.
3. In-line excess flow valves are installed so likely piping damage will occur downstream of the valve and will not separate the valve from the upstream piping.

When the excess flow valves can be examined separate from the line (before the installation or if removed for system maintenance), they should be checked to see that the parts are in good condition and that the poppet can be pushed fully closed.

### Testing of Excess Flow Valves

In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating.

This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained. The exact procedure used may vary with the installation, advisability of gas discharge, and availability of equipment.

In general, most testing makes use of the fact that excess flow valves are "surge sensitive" and will close quicker under a sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick-closing valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

A test involving venting gas to the atmosphere is hazardous and may be impractical, or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valve's condition, and the flow rate sizing for those test conditions.

For additional information on excess flow valves and other means of shut-off protection, contact REGO® and refer to NFPA 58.

Prepared by  
NATIONAL PROPANE GAS ASSOCIATION

The purpose of this bulletin is to set forth general safety practices for the installation, operation, and maintenance of LP-Gas equipment. It is not intended to be an exhaustive treatment of the subject, and should not be interpreted as precluding other procedures which would enhance safe LP-Gas operations. The National Propane Gas Association assumes no liability for reliance on the contents of this bulletin.

# HOSES



HOSES



Parker Hannifin Corporation  
 Industrial Hose Division  
 30242 Lakeland Boulevard  
 Wickliffe, OH 44092-1747  
 Telephone: (440) 833-2120  
 Fax: (440) 833-2230  
 www.safehose.com

## Technical Advisory

### PRODUCT UPDATE

### LP Gas Hose/Assemblies — Permeation

Permeation of high-pressure gas (such as LP Gas/propane, anhydrous ammonia and steam) through a rubber hose is a common but often misunderstood phenomenon. During the manufacturing process, small perforations – sometimes called pinpricks – are applied to the cover of the hose. The perforations allow a path for the gas to safely permeate through the hose wall and into the atmosphere. Without this path, undesirable amounts of gas could accumulate in the hose body, blistering the cover and leading to premature hose failure.

The permeation process is invisible in most circumstances. However, when the hose is moist or sits in water, bubbles may be observed emerging from the pinprick holes in the cover. Or bubbles may be observed slowly escaping from the area where the ferrule attaches to the coupling stem. These emissions may be perceived as leakage.

The most common perceived leakage is the “normal” escape of permeating gas:

- Through the hose wall. The pinprick holes concentrate the permeation to specific areas of the cover. Due to the presence of moisture, this concentration of permeation may be observed as bubbling.
- Through the interface of the ferrule and coupling. In some instances the permeating gas may travel down the reinforcement of the hose and escape from the end of the hose encased by the coupling.

Another common perceived leakage is the escape of air from the hose reinforcement through the hose wall, most commonly noticed during the pressure testing of a hose assembly. During the manufacturing process, air may become trapped in the reinforcement of the hose. During the hose assembly testing process, the trapped air may be squeezed through the pinprick holes in the cover, or from the end of the hose encased by the coupling. In the presence of moisture, the venting air may be apparent as bubbling. The escape of trapped air through the pinprick holes and/or at the coupling should diminish over time, and should disappear after one to four hours of pressurization. Generally, air escaping from the pinprick holes will dissipate much more rapidly than air escaping at the coupling.

The question that remains: *How can one differentiate between a hose that is leaking or excessively permeating LP Gas, a hose that is appropriately permeating LP Gas, and a hose that is venting trapped air?*

When testing a new LP Gas hose assembly, only escaping air can be mistaken for leakage (because propane has not yet entered the hose). Two methods for assuring that the escaping air is not from a leak are:

- 1) Use water as the test media. A “true” leak will be a water leak and not an air leak.
- 2) Increase the test time. A test of sufficient duration will allow the escaping air to be purged. Note:
  - a. The use of a rubber cement or epoxy to seal the hose end may eliminate air escaping from the stem/ferrule lock-on area of the coupling.
  - b. The Parker 7661-LAR coupling in the 1-inch size is designed to prevent gas from escaping from the stem/ferrule lock-on area of the coupling.

When testing a hose in service, it is much more difficult to differentiate between a “true” leak and normal permeation. Generally, leaking propane will create a frosting or icing on the surface of the hose or coupling. On the other hand, permeation is generally at such a low rate that it can be detected only by the slow escape of bubbles. It is important to note that the rate of permeation is dependent on temperature. As the environmental temperature increases so does the rate at which the gas permeates through the hose. Therefore, on hot, rainy days, the likelihood of observing permeation is much higher. If the rate of escaping gas is enough to cause concern, the best way to determine whether a hose is leaking or not is to remove it from service and perform a hydrostatic pressure test.

In the transfer of LP Gas, the allowable permeation rate is controlled by the Underwriters Laboratories Standard UL 21 for LP Gas Hose. Per UL 21, the “Maximum Allowable Permeation Rate” for LP Gas hose is 171 cm<sup>3</sup>/ft/hr. Testing of standard Parker LP Gas hose has produced permeation rates which are five times better than the allowed maximum.

If there are any questions please contact Parker Customer Service toll-free at:

866.810.HOSE (4673)	800.242.HOSE (4673)
Wickliffe, OH • Eastern USA	South Gate, CA • Western USA

Nozzles in the GasGuard "GG20" series are designed to reach into, and connect to, deep-seated filler valves, as associated with forklift truck cylinders and RV filler valves in similarly difficult locations. This is possible due to the extended connector on the outlet of the nozzle which allows customers to connect to fill points with a more difficult access point. There are three different nozzles in the UL listed GG20 range, the **GG20**, the **GG20H** and the **GG20DN**, which cater for differing customer needs. With a 35mm longer connector the nozzles are engineered with the same function as their shorter GG1E, GG1EH and GG1DN counterparts. With a lightweight & well balanced construction, the GG20 series design has seen significant improvements in operational performance and reduced maintenance requirements, and like all GasGuard nozzles, they are fully repairable.

#### Standard Specifications for GG1 series nozzles:

Connector thread coupling:	1¾" ACME x 6 TPI form
Swivel Inlet thread:	15mm (½") or 20mm (¾") N.P.T. female
Nett mass:	2.0kgs (4.4lbs)
Max. operating pressure:	2450 KPa (350 psi)
Operating temperature:	-40 to +110 deg. C

#### Standard features on all GasGuard Autogas Nozzles:

- **Safety:** Cannot discharge LPGas to the atmosphere when not coupled and lever is actuated.
- **Safe connection:** Nozzle will safely seal with filler valve, even if its sealing gasket is missing.
- **Swivel:** Option of either 15mm (½"), 20mm (¾") N.P.T. internal thread to the inlet swivel to the Nozzle.
- **Latching:** An optional lever hold-open latch is available (not UL listed).
- **Robust:** High strength aluminium alloy connector casting with a stainless steel ACME thread Insert provides long service without distortion.

#### GG20 Nozzle Characteristics

Nozzle is used for industrial refueling of forklift truck cylinders and RV filler valves in similarly difficult locations. It uses a single nose piece to achieve high flow rates.

- Flow rate of 63L/min at 12bar system pressure
- Release Volume on valve closure of 1.9cm<sup>3</sup>
- Customer experiences a low lever pressure
- Magnet option for dispensers with reed switch technology
- New guided extended thread assists with alignment and connection to fill point
- A fine filter comes standard in all nozzles
- Long Connector Nut to access "hard to reach" fill points
- UL Listed



GG20 Nozzle

### GG20H Nozzle Characteristics

Nozzle is used for industrial refueling of forklift truck cylinders and RV filler valves in similarly difficult locations. It incorporates a new "hybrid" nose piece to reduce the lever pressure experienced by the customer.

- Flow rate of 60L/min at 12bar system pressure
- Release Volume on valve closure of 1.7cm<sup>3</sup>
- Customer experiences a lower lever pressure than GG20
- Magnet option for dispensers with reed switch technology
- New guided extended thread assists with alignment and connection to fill point
- A fine filter comes standard in all nozzles
- Long Connector Nut to access "hard to reach" fill points
- UL Listed



GG20H Nozzle

### GG20DN Nozzle Characteristics

The GG20DN nozzle is suited for refueling of passenger vehicles by untrained personnel. It incorporates a patented Dual Nose piece which significantly reduces the amount of user error when operating the nozzle. It creates a positive seal to the customer's vehicles even if they have not tightly screwed the nozzle to the fill point. If the nozzle is not screwed on completely and the lever is pulled, there is no effect of flow rate as the Dual Nose piece compensates for the changed operating situation.

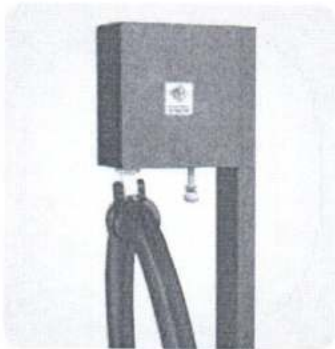
- Flow rate of 60L/min at 12bar system pressure
- Release Volume on valve closure of 1.7cm<sup>3</sup>
- A Dual Nose piece for added customer safety
- Customer experiences a lower lever pressure than GG20
- Magnet option for dispensers with reed switch technology
- New guided extended thread assists with alignment and connection to fill point
- A fine filter comes standard in all nozzles
- Long Connector Nut to access "hard to reach" fill points
- UL Listed



GG20DN

## POMECO 102 Spring Balance Single Hose Retractors

POMECO 102 Spring Balance Single Hose Retractors keep excess hose off the ground and out of the way, prolonging hose life and reducing potential hazards. The POMECO 102 is a California Air Resources Board (CARB) certified Stage II component for use with single and dual hose dispensers as per Executive Order G-70-52-AM.



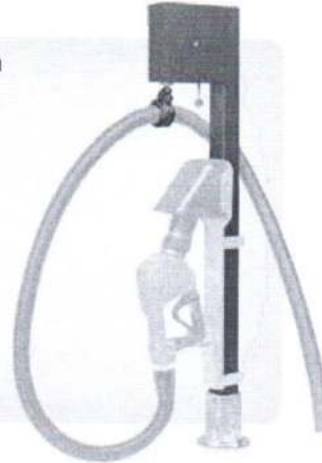
Post Mounted

### Materials

**Housing:** Cast aluminum

**Cable:** Black polyester

**Post:** Aluminum



Nozzle Hook and Hood Kit Not Sold by OPW.

### Features

- ◆ Easy to Use – the spring-loaded reel and stretch-resistant cable provide smooth and steady tension throughout hose extension and return.
- ◆ Easy to maintain – the removable sideplate provides full access to the mechanism for easy tension adjustment and unit maintenance. A convenient safety thumb screw is provided to lock the reel in place during tension adjustment.
- ◆ Field Adjustable for Various Hose, Nozzle, Swivel, Breakaway Combinations – no need for upgrading components if a breakaway or swivel is added to the hose assembly. Simply change the tension setting on the spring-loaded hose reel.
- ◆ Multiple Mounting Options – the POMECO 102 retractor housing is tapped on the top for bolting to overhead crossbars, and on the side for mounting to vertical posts. The 102 is available as a retractor kit (including post, retractor and mounting hardware) or as separate components. Models are also available for aboveground storage tank (AST) applications. AST models include a 44" (112 cm) post with a freestanding base.

102 Spring Balance Hose Retractor  
Instruction Sheet Order Number:  
**H15853PA**

NOTE: See OPW's Website at [www.opwglobal.com](http://www.opwglobal.com) for product instruction sheets, trouble-shooting guides, how-to-use guide and to view the Do's & Don'ts at the Gas Pump video.



## Ordering Specifications

### Vertical Retractor Kits (Box, Post, Bracket, Foot & Hardware)

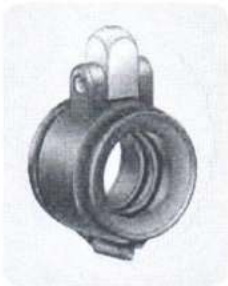
Model Number	Mounting Method	Clamp Fits	Weight	
			lbs.	kg
6102-1039P	39" Retractor/Post Kit	(Hose Clamp Not Included)	12	5.4
6102-1078P	78" Retractor/Post Kit	(Hose Clamp Not Included)	14	6.4
6102-1100	78" Retractor/Post Kit	(Hose Clamp Not Included)	14	6.4
6102-AST	AST	(Hose Clamp Not Included)	9	4.1

## Ordering Specifications

### Separate Retractor Components (Box Only)

Model Number	Mounting Method	Clamp Fits				Weight	
		Hose O.D.		Hose I.D.		lbs.	kg
		in.	mm	in.	mm		
6102-1000	Overhead Crossbar/Verticle Post	(Hose Clamp Not Included)				7	3.2
6102-4000	Overhead Crossbar/Verticle Post	1 1/4"	35	1"	25	7	3.2
6102-6000	Overhead Crossbar	1 1/2"	26	3/4" or 1/2"	16 or 19	7	3.2
6102-8000	Overhead Crossbar	1"	25	3/8"	16	7	3.2
6102-CNG	Hose Retractor Kit, CNG						
6102-CNG2	Hose Retractor Kit, CNG2						

\*POMECO recommends using C05238M, C05261M or P100-3F/P100-44/P100-2AST for use with 102 Series retractors. Other size tubes and clamps available upon request.



Hose Clamp

## Ordering Specifications

### Hose Clamps

Model Number	Hose Clamp Size †
PB-1396	Standard 1 1/4" O.D. Hose (1" I.D.)
PB-1394	Standard 1 1/4" O.D. Hose (3/4" I.D.)
PB-1375	Standard 1 1/2" O.D. Hose (3/4" or 1/2" I.D.)
PB-1373	Standard 1" O.D. Hose (3/4" I.D.)
PB-1344	Balanced Coaxial, Goodyear Premier

† Other sizes available upon request

## Options Replacement Parts

Model Number	Hose Clamp Size
C05238M	Post Kit, 39" (99 cm), 1 1/4" x 2"
C05261M	Post Kit, 78" (198 cm), 1 1/4" x 2"
H15212M	10 ft. Replacement Cable
P338SPOOL	Spool of Retractor Cable, 338 ft.
H15210M (P102-02)	Replacement Cable Guide
H15211M	Replacement Reel
P100-3F	AST Replacement Base
P100-2AST	Sliding Bracket (AST)

# RESUME

RESUME



## Resume

### THEODORE C. LEMOFF

**Current Position:** Engineering Consultant

**Education** B.E. (Chemical Engineering), City College of New York,  
New York, NY, 1967  
M.B.A. (Business Administration), Xavier University,  
Cincinnati, OH, 1979

**Certifications** Registered Professional Engineer, Florida and Massachusetts

#### **Experience**

2010 – Present Principal, TLemoff Engineering.

Code consultation: Provide opinions on the applicability of gas code provisions in specific cases. Work includes review of history of code text to identify the intent of code provisions, providing verbal and written explanations, and follow-up with officials and other parties as required.

Code expert in legal cases: Provide written explanation of the intent of code requirements, when cited by other parties. Incident site visits to determine code compliance or non-compliance and opinion as the relevance thereof. Review depositions for accuracy of code related statements. Provide testimony at depositions or trials as needed.

Product support: Provide assistance to manufacturers on product specific code requirements, and propane industry practices. Assist with liaison with approval laboratories. Work with local officials on product acceptance.

Seminars: Presented talks and seminars on NFPA 54 and NFPA 58 in the United States, Santa Cruz, Bolivia, and Doha, Qatar.

1985 - 2010 National Fire Protection Association, Quincy, MA

### Principal Gases Engineer

Staff liaison to all gases committees administering LP-Gas, Fuel Gas, and Liquid Natural Gas, and Ovens and Furnaces committee. Duties in addition to the administration of the standards making process include information interpretations as requested, speaking engagements and technical advice to NFPA books, films and other products.

NFPA representative to technical committees of the American Gas Association, National Propane Gas Association, and Compressed Gas Association, and the U. S. Department of Transportation Pipeline Advisory Committee. Voting member of the Uniform Plumbing Code and Uniform Mechanical Code committees.

Developed and maintained formal training programs on NFPA 58, Liquefied Petroleum Gas Code and NFPA 54, National Fuel Gas Code. Seminars presented throughout the United States.

1980 - 1985      Badger Engineers, Inc., Cambridge, MA and The Hague, Holland

### Senior Project Engineer

Various assignments in the Cambridge, MA and the Hague, Holland offices covering the full range of project engineering activities including coordination, design, flow diagrams, equipment bid evaluation and selection.

1978 - 1980      Table Talk Pies, Division of Squibb Corporation, Worcester, Ma

### Plant Engineer

Responsible for all engineering and maintenance for the bakery, freezer warehouse, distribution centers, and truck fleet.

1973 - 1978      Sun Chemical Corporation, Staten Island, NY and  
Cincinnati, OH

### Engineering Manager

Responsible for all fire protection engineering and maintenance for the manufacturing facilities and associated offices and laboratories.

1967 - 1973      The Proctor and Gamble Company. Cincinnati, OH

### Process Engineer

Broad range of assignments in detergents R&D.

**Memberships and Affiliations**

NFPA Technical Committee on National Fuel Gas Code (NFPA 54)  
NFPA Technical Committee on Liquefied Petroleum Gases (NFPA 58)  
American Institute of Chemical Engineers, Member  
Society of Fire Protection Engineers, Member  
National Fire Protection Association, Member  
National Propane Gas Association, Member

**Publications**

Editor, Liquefied Petroleum Gases Handbook, 8 editions  
Editor, National Fuel Gas Code Handbook, 6 editions  
Co Author, NFPA Pocket Guide to Fuel Gas Storage and Use

**Patent**

Spray-Dried Detergent Composition, US # 3,801,511 (Assigned to the Proctor and Gamble Company)

January, 2015



# MEMO

## Kaukauna Utilities

To: Mayor Tony Penterman  
From: Michael Avanzi  
Date: May 7, 2024  
Re: City Property for Water Treatment Facilities

As discussed with the Common Council on December 19, 2023, Kaukauna Utilities (KU) has been working on a comprehensive water study for about 2 years. In the study, there are 4 alternatives for the main water filter plant (no change – react when failure occurs, replace the pressure filter tank at the current location, rebuild the water treatment building and reservoirs at current location, and a new water treatment plant at a new location). The existing main water filter plant site, originally developed in 1899, is located at 304 Elm Street. Water from 3 of Kaukauna's 5 wells is treated and stored at the main water filter plant site making it a critical component of Kaukauna's water supply. The pressure filter tank (for iron, manganese, and radionuclide removal) at the main water filter plant is over 60 years old and is at the end of its service life. The tank was temporarily patched 7 years ago and will need to be replaced within the next 3 to 5 years. The 2 ground storage reservoirs and building that houses the booster pumps are also in poor condition. In addition, the main water filter plant site is located in a floodplain. Alternative 4 minimizes the most risk factors that were considered. Alternative 4 consists of building a new water treatment plant with reservoirs and a booster pump station at a new location outside the floodplain. The new main water treatment plant location would allow for

the necessary building size for new treatment. This alternative would replace the equipment and structures identified in the water system study report as being past their useful life. Alternative 4 also allows the existing main water filter plant to continue producing water while the new water treatment plant is built. This eliminates a huge risk since rebuilding at the same site would require about a 2-year outage of 3 out of 5 wells supplying water to the city. At its meeting on April 24, 2024, this is the alternative that the water ad hoc committee decided to recommend to the Utility Commission.

In terms of the location where to relocate the main water filter plant, there were 4 sites considered. See Figure #1 below depicting the 4 sites. Proposed Site #1 is on Boyd Avenue, just south of the city pool at the current archery range site. This site is desirable due to its proximity to the existing raw water transmission main, and the property is currently owned by the City of Kaukauna. This site is also uphill from the river, fairly level, and out of the floodplain. Proposed Site #2 is to the west of the Konkapot Creek Trail. This site is also near the existing raw water transmission main. This site is undesirable due to the steep topography in this area. Proposed sites #3 and #4 are in Horseshoe Park. These sites are beneficial because they are already located on City-owned property and are near the raw water transmission main. These sites are also outside the floodplain. Site #3 is north of the baseball field. This site is not desirable due to the steep slope. Site #4 is not desirable because it is a former fill site unsuitable for building foundations. The water ad hoc committee chose Site #1 as the preferred site for the main filter plant and wishes for KU to work in good faith with the City of Kaukauna on obtaining rights to this property. See Figure #2 below for a footprint of the proposed site. The façade of any structures on the property will have a masonry appearance to match the area (tied

into the theme of the new Kaukauna pool site) and landscaping will be provided as needed.

As part of the water study, KU has also been working with its consultant on evaluating various water treatment options. Many options were considered, but 5 options made it to the top of the list for consideration. Water treatment option 1 is to keep the existing treatment process and not remove hardness from the water. All the other top 5 options involve treating for the hardness of the water so that KU customers no longer have to do so. Water treatment option 2 is ion exchange water treatment. Ion exchange functions as a large-scale water softener similar to what most people have in their homes. Water treatment option 3 is reverse osmosis or nanofiltration treatment. This treatment process consists of pushing water through a semipermeable membrane using high pressure. Water treatment option 4 is pellet softening treatment. With pellet softening, water is pushed through a fluidized bed of sand. The chemistry concept of pellet softening is the same as lime softening. Water treatment option 5 is for Kaukauna Utilities to switch to surface water as a source of water. This option has the benefit of eliminating the issue of radium and high water hardness associated with Kaukauna's groundwater. There are 2 communities nearby that are wholesale suppliers for surface water. At the April 24, 2024 meeting, the water ad hoc committee decided to recommend Option 3 (Reverse Osmosis or Nanofiltration) to the Utility Commission.

In order to limit the cost impacts of this new water treatment option, it is recommended to consolidate two of KU's current well sites. Raw water from Wells 8 and 9 would be treated at an upsized Well 9 water treatment plant located north of the Fox River. A raw water transmission main between Well 8 and 9 would be installed, and the Well 8 water treatment plant would remain for pretreatment to



remove iron. This would require an expansion of the Well 9 site. See Figure #3 below for the potential expansion area needed. The expansion area consists of land currently owned by the City of Kaukauna. The façade of any structures on the property will have a masonry appearance to match the area and landscaping will be provided as needed.

Due to the limited remaining lifespan of critical components at the main filter plant, the goal is to complete this project in 3-4 years. This is a fairly aggressive timeline given the scope of work involved. With that, the design and permitting phase needs to commence this summer. The plan is to present a recommendation to the Utility Commission at the May meeting, which would be rescheduled until after the May 21<sup>st</sup> Common Council meeting. At the June Utility Commission meeting, a final decision would be made and KU staff would formally begin the design and permitting phase of the project. This concept is being introduced at today's Common Council meeting and will be presented to the Plan Commission and Board of Public Works prior to the May 21<sup>st</sup> Common Council meeting.



Figure #1: Main Filter Plant Proposed Site Options

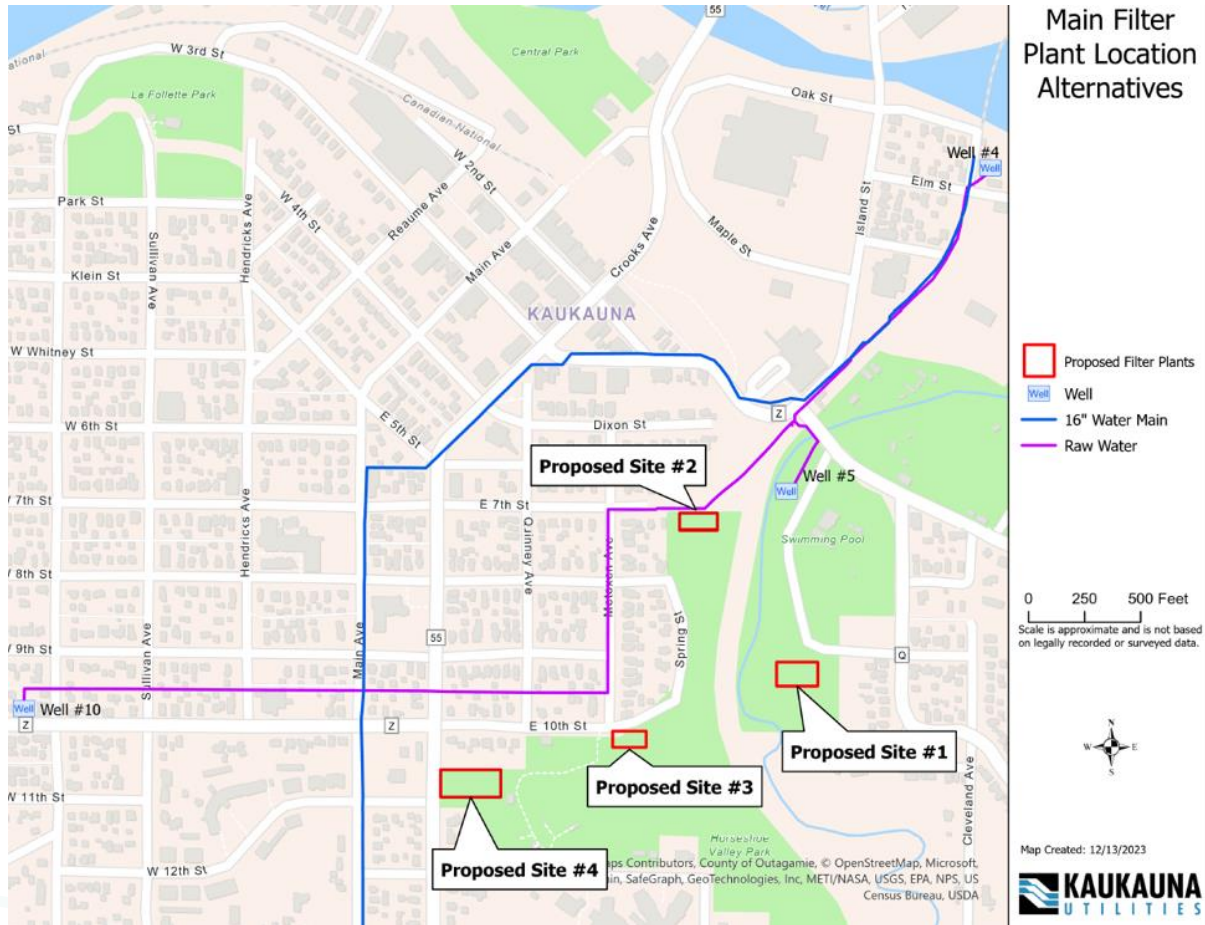


Figure #2: Proposed Main Filter Plant Site

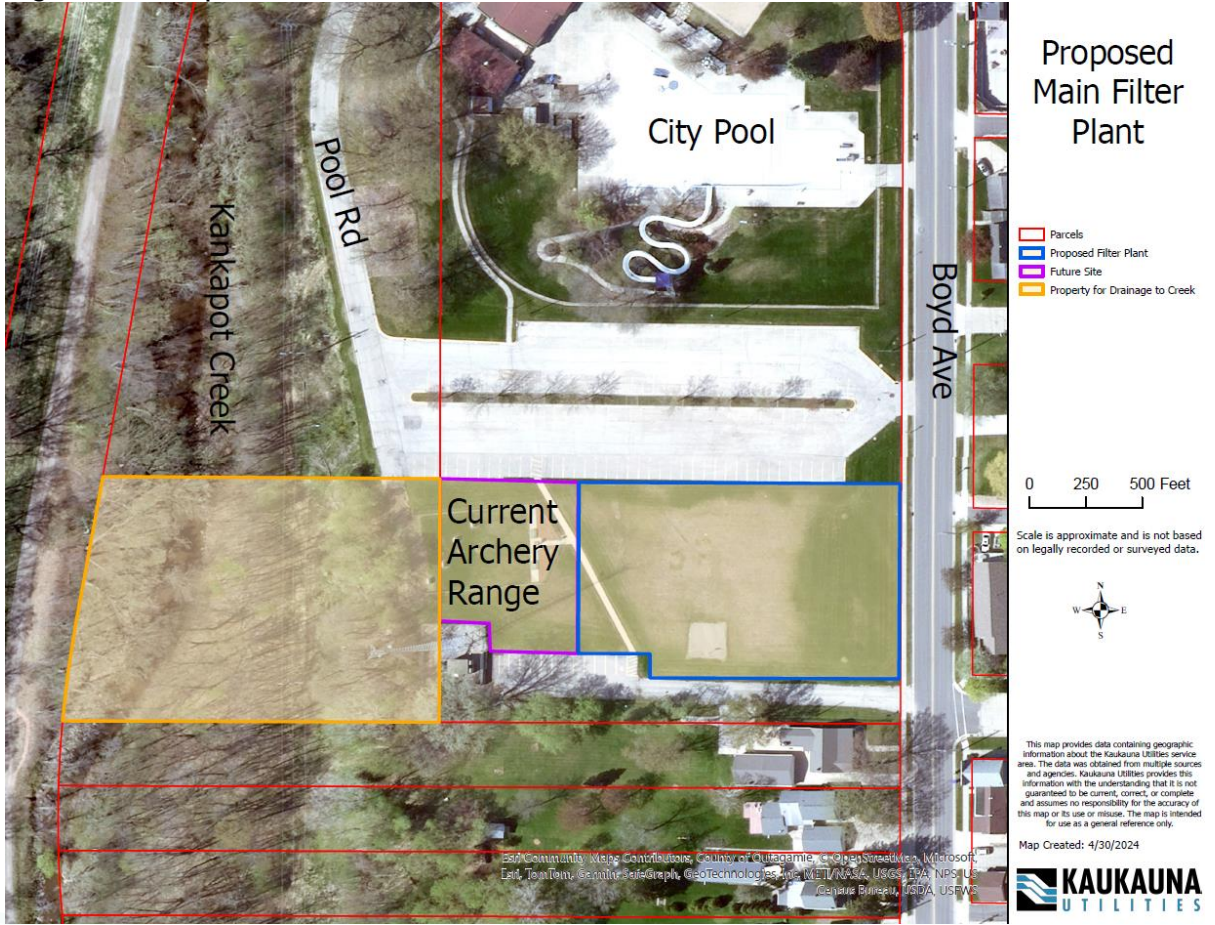
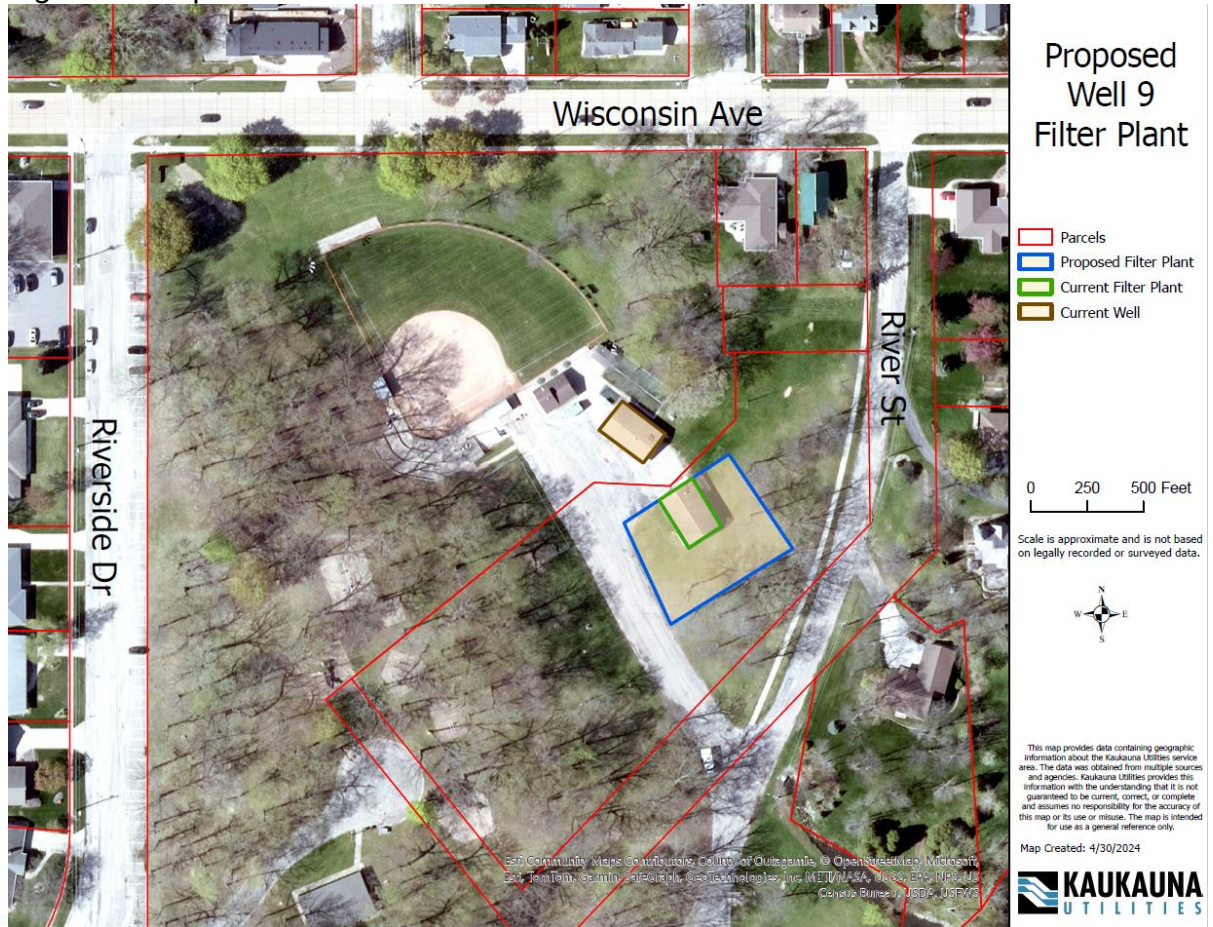


Figure #3: Expansion of Well 9 Site



Sincerely,

Michael Avanzi  
General Manager  
Kaukauna Utilities

Cc: Sally Kenney  
Tim Greenwood



# MEMO

## PLANNING & COMMUNITY DEVELOPMENT

To: Plan Commission  
From: Lily Paul, Associate Planner  
Date: May 3, 2024  
Re: Park Donation Application Review - Bench

A Park Bench Donation application has been submitted by Erica Schoenfelt to be installed at Horseshoe Valley Park on the trail leading to Konkapot Creek Trail. The bench is being donated in honor of her late Mother, Diann Schoenfelt who was born and raised in the community near Horseshoe Valley Park. This is a great way to establish a memorial.

The plaque inscription will say:

*"In Loving Memory of  
Diann M. (Zobel) Schoenfelt  
12/7/61 - 5/18/23"*

### **Staff Recommendation**

Staff recommends to approve the park bench donation for Erica Schoenfelt in honor of her mother Diann Schoenfelt and direct staff to work with the donor to pick a precise location.



APPLICATION FOR PARK DONATION

Donor Name: Erica Schoenfelt

Phone Number: 920-903-2461

Address: 6581 N Bethmar Ln Milwaukee WI 53209

Email Address: Schoenf4@gmail.com

Proposed Location: Horseshoe park near pond / trail area (44°16'17" N

Type of Donation:

88°16'11" W)

Cambridge Bench

Picnic Table

Tree

Book Exchange

Garbage Receptacle

Other Item (Please Describe)

Inscription Text (If Applicable)

In Loving Memory  
of  
Diana M. Schoenfelt (Zobel)  
12/7/61 - 5/18/23

Please attach any necessary photos or documents with this form

Park Donations to the City of Kaukauna are considered outright and unrestricted donations. The City of Kaukauna does not guarantee the permanency of the accepted donation. If a memorial must be relocated, Department staff will attempt to notify the donor in writing at the address shown on this form. Donations may be tax deductible (please consult an accountant). The donor declares to have read the Parks Donation Policy and Guidelines. The donor understands and agrees with the conditions set forth in this policy and agrees to any conditions required by City staff or elected officials.

By signing below, I acknowledge that I have read and understand the Parks Donation Policy and Guidelines

*Erica Schoenfelt*



# MEMO

## PLANNING AND COMMUNITY DEVELOPMENT

To: Plan Commission  
From: Dave Kittel, Director of Planning and Community Development  
Date: 5/3/2024  
Re: 122 Island St Remnant parcel

On November 17, 2022 an item was brought forth to the plan commission on a remnant parcel. This remnant is due to the dedication of right-of-way and the realignment of the Island/Elm intersection in 2022. See the attached memo with maps from the November 17, 2022 meeting for greater detail. During the meeting on November 17, 2022 the plan commission made a motion to recommend to the Common Council to transfer the remnant to the adjacent property owner, minutes from this meeting are also included in packet. For unknown reasons, this item appears to have not gone forth to the Common Council. The property owner is still interested in the remnant parcel and considering the maintenance of mowing, shoveling, repair/replacement of walks and streets, it would be advantageous for the City to transfer the remnant parcel to the abutting property owner. Due to the amount of time between now and the last time this was in front on the Plan Commission this item is coming back for review and action.

### **Recommendation:**

**Motion to direct staff to prepare documents including a survey and deed to transfer the remnant of parcel 325008400 also known as Lot 1 Block 2 Kaukauna Island Plat to the adjacent property owner and to recommend the transfer of the same to City Council.**

**City of Kaukauna  
Plan Commission**

**October 20, 2022**

jn/engr dept

**Agenda Item**

**Disposition of City Land – Remnant Parcel – 122 Island Street**

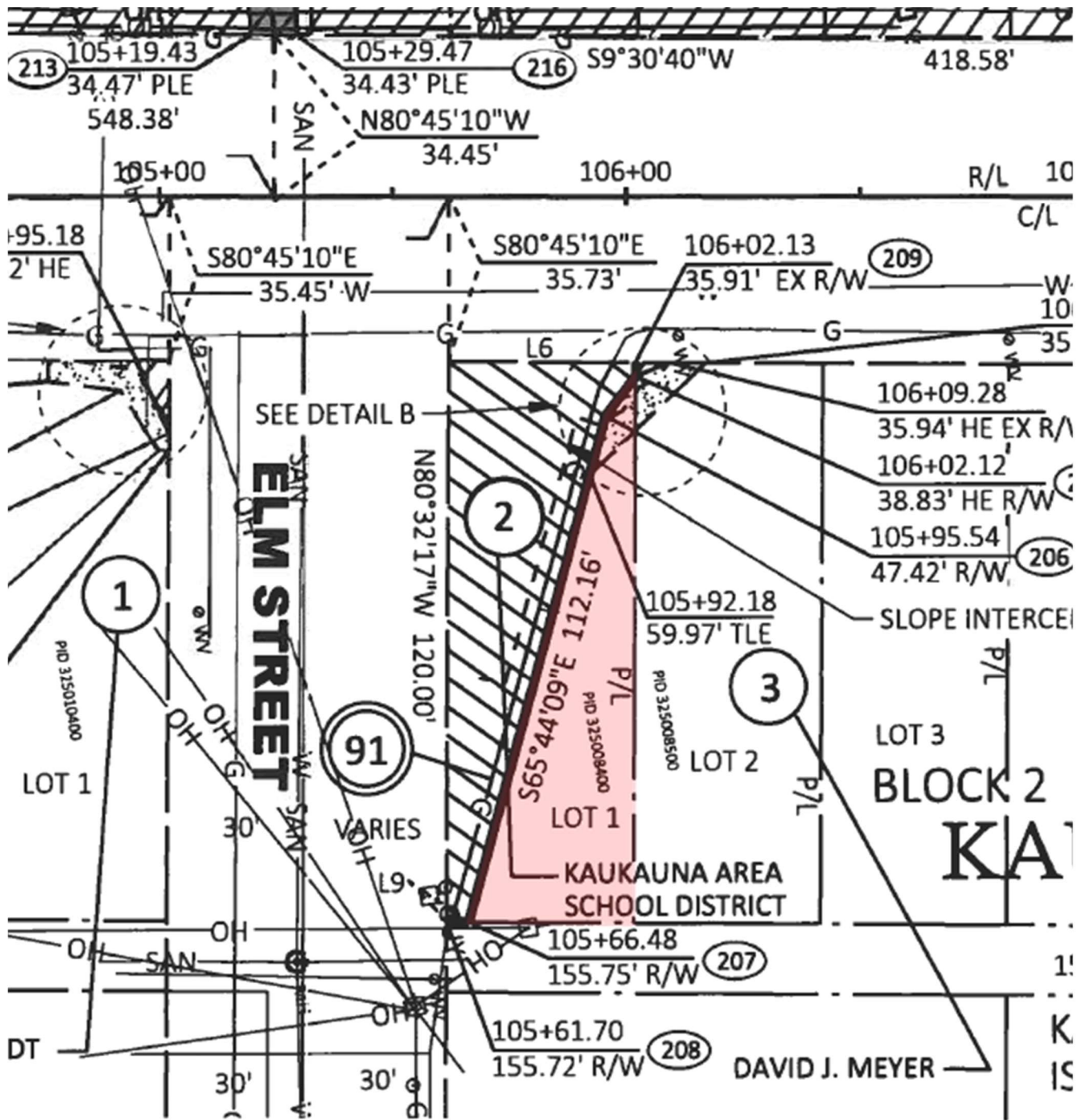
**Background**

Due to the dedication of right-of-way and re-alignment of the Island/Elm intersection from a 2022 City project, there is a remnant parcel owned by the City shown on the attached sketches. Director of Public Works does not believe that any use of this parcel is needed by the City. Considering the maintenance of mowing, shoveling, repair/replacement of walks and streets, it would be advantageous for the City to transfer the remnant parcel to the abutting property owner.

**Staff Recommended Action**

**Motion to direct staff to prepare documents including a survey and deed to transfer the remnant of parcel 325008400 also known as Lot 1 Block 2 Kaukauna Island Plat to the adjacent property owner and to recommend the transfer of the same to City Council.**





FD





# PLAN COMMISSION

City of Kaukauna  
**Council Chambers**  
 Municipal Services Building  
 144 W. Second Street, Kaukauna

Thursday, November 17, 2022 at 4:00 PM

## MINUTES

The meeting was called to order at 4:00 PM.

### 1. Roll Call

Members Present: Avanzi, Feller, Moore, DPW Neumeier, Mayor Penterman, Schoenike, Thiele and PCDD Stephenson

Others Present: AP Paul, Brandon Wegner from Mach IV

### 2. Approval of Minutes

#### a. Approval of Minutes from October 20, 2022 Meeting

There was a request to revise section 3. b. of the October 20, 2022 Meeting Minutes. Avanzi motioned to approve the minutes with the revisions. Schoenike seconded the motion. The motion passed.

### 3. Old Business.

#### a. Disposition of City Land – Remnant Parcel – 122 Island Street

Avanzi mentioned that the water study area was reviewed and the property in question will not be effected. A motion was made by Moore to approve the disposition of the City's remnant parcel at 122 Island Street to the adjacent property owner. Schoenike seconded the motioned. The motion passed.

### 4. New Business.

#### a. Certified Survey Map Review – Bernatello's Pizza

AP Paul presented a CSM submitted by Mach IV showing a lot combination for Bernatello's Pizza. Bernatello's is now in ownership of the stormwater pond, driveway and parking area and the CSM is combining this land with their current property. DPW Neumeier brought up two points:

- The document number for the No Build easement along the west line is incorrect
- There needs to be an addition of a power easement

A motion was made by DPW Neumeier to accept the CSM with the changes mentioned above. The CSM must be submitted back to City Planning Department for in house approval before being passed on to Common Council. Seconded by Thiele. Motion passed.

#### b. Site Plan Review – Bassett Mechanical Corporate Office Addition

AP Paul presented the site plan review for Bassett Mechanical's corporate office addition off the south end of their existing facility. This an 8600 square foot addition to accommodate more office space, common areas, bathrooms, and conference rooms. There will be associated parking lot accommodation as well to account for this expansion. This is located in the Industrial Park District (IPD). All setback, height, parking, façade, landscaping, stormwater and erosion control requirements are being met.

5. Other Business.

*There was no other business.*

6. Adjourn.

A motion was made by Thiele to adjourn the meeting. Moore seconded the meeting. The meeting was adjourned at 4:16 PM.



# MEMO

## PLANNING & COMMUNITY DEVELOPMENT

To: Plan Commission  
 From: Lily Paul, Associate Planner  
 Date: May 3, 2024  
 Re: Additional Easement Review – Blue Stem Meadows 3 (CSM 8540 & 8541)

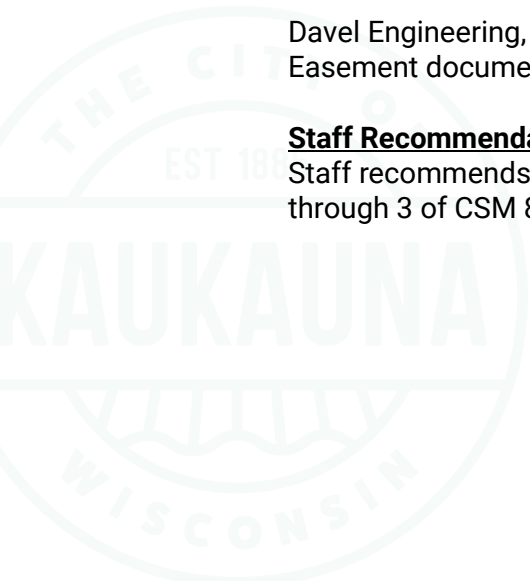
Blue Stem Meadows 3 is a subdivision development south of CTH CE and east of Haas Road. Lots 117 through 122 of Blue Steam Meadows 3 were split in July, 2023 to reduce the lot width to 74 or 75 feet and create one more lot. These lots are smaller in size for cottage style homes. These lots are now Lot 1 through 3 of CSM 8540 and Lot 1 through 4 of CSM 8541. Please see exhibit attached.

During the creation of the drainage plan, both the plat and the lot split CSMs did not show necessary drainage easements, and a storm sewer easement between Lot 2 of CSM 8541 and Lot 3 of CSM 8541.

Davel Engineering, agent for owner, Dercks Dewitt LLC, has submitted a Permanent Easement document to show the easements explained above. Please see exhibit attached.

**Staff Recommendation**

Staff recommends to approve the easements for Blue Stem Meadows Lot 123, Lots 1 through 3 of CSM 8540, and Lots 1 through 4 of CSM 8541





City of Kaukauna Drainage Easement Restrictions:

The following uses and structures are prohibited within all "Drainage Easements" granted in this document; filling, grading, and excavating except for construction of drainage ways and drainage facilities; the cultivation of crops, fruits, or vegetables; the dumping or depositing of ashes, waste, compost or material of any kind; the storage of vehicles , equipment, materials or personal property of ay kind and constructing, erecting or moving any building or structure, including fences, within the drainage easement.

City of Kaukauna Drainage Easement Maintenance:

Maintenance of all drainage ways and associated drainage structures within the subdivision of Blue Stem Meadows 3 are the sole responsibility of the property owners in the subdivision, unless otherwise noted on the drainage plan which has been prepared for this subdivision and which has been approved by and is on file with the City of Kaukauna.

Upon failure of any property owner to perform maintenance, abide by restrictions, or follow grading requirements of the drainage ways and associated drainage structures, the City of Kaukauna retains the right to have maintenance or corrective measures performed. The cost of said maintenance or corrective measures on any given lot shall be a special charge to the non-complying lot.

Maintenance by the City to include, but not limited to, the removal of silt and decomposed vegetation that gradually accumulates in the bottom of a pond, a detention area, and/or accompanying ditch. Payment for city maintenance may be placed on the annual real estate tax bill from all contributing sources as a special assessment if not paid.

Grading and Grades

All grading and final grades for the construction of any public or private improvements, including landscaping, shall conform to the surface water drainage plan as approved and on file with the City of Kaukauna.

Parcel No	Lot No.
325118156	CSM 8540 Lot 3
325118157	CSM 8540 Lot 2
325118164	CSM 8540 Lot 1
325118158	CSM 8541 Lot 4
325118159	CSM 8541 Lot 3
325118160	CSM 8541 Lot 2
325118161	CSM 8541 Lot 1
325118162	BSM 3 Lot 123



**DAVEL ENGINEERING &  
ENVIRONMENTAL, INC.**  
*Civil Engineers and Land Surveyors*

1164 Province Terrace, Menasha, WI 54952  
Ph: 920-991-1866 Fax: 920-441-0804  
www.davel.pro

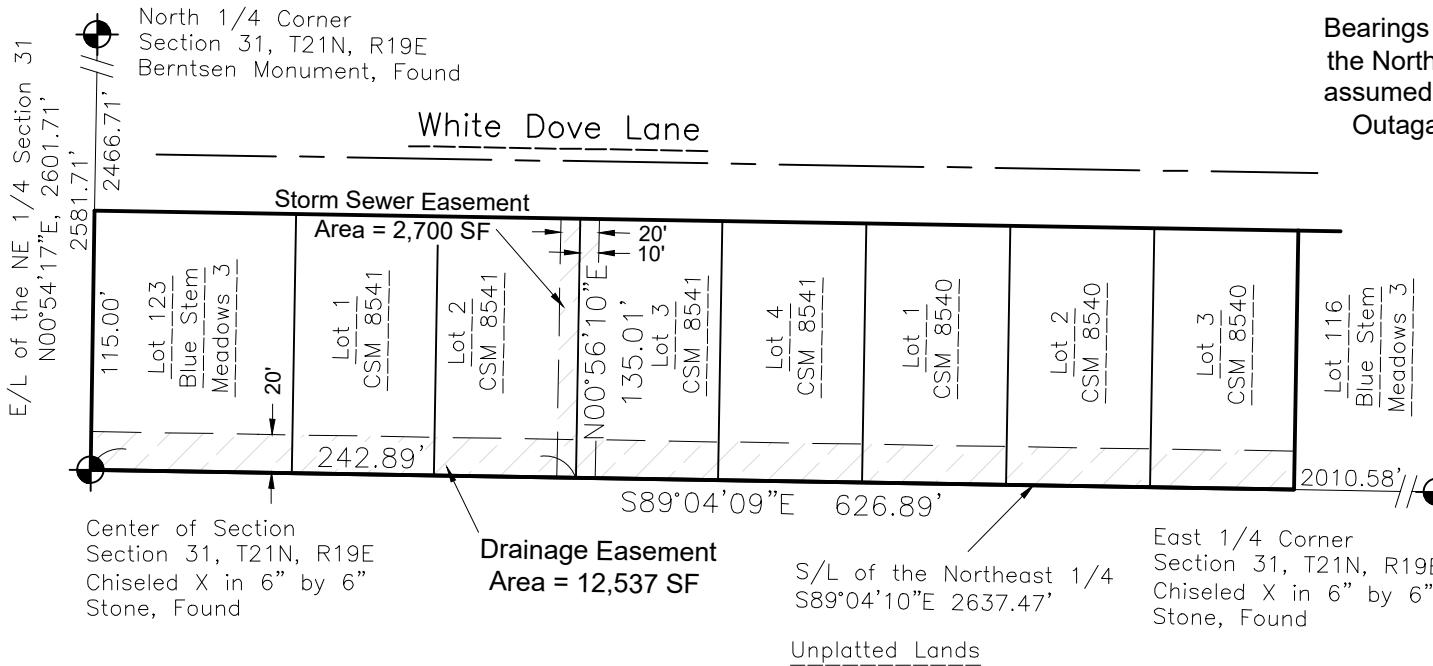
File: 4198Ease5.dwg  
Date: 05/03/2024  
Drafted By: Jim  
Sheet: 2 of 3

# Easement Exhibit

Part of Lot 123, Blue Stem Meadows 3; Part of Lot 1, 2, and 3, Certified Survey Map 8540; and part of Lot 1, 2, 3 and 4, Certified Survey Map 8541; all being located in Southwest 1/4 of the Northeast 1/4, Section 31, Township 21 North, Range 19 East, City of Kaukauna, Outagamie County, Wisconsin.



Bearings are referenced to the South line of the Northeast 1/4, Section 31, T21N, R19E, assumed to bear N89°04'10"W, base on the Outagamie County Coordinate System.



**DAVEL ENGINEERING & ENVIRONMENTAL, INC.**

Civil Engineers and Land Surveyors

1164 Province Terrace, Menasha, WI 54952  
Ph: 920-991-1866 Fax: 920-441-0804  
www.davel.pro

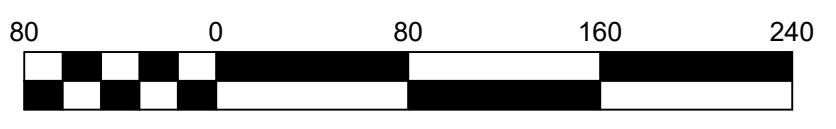
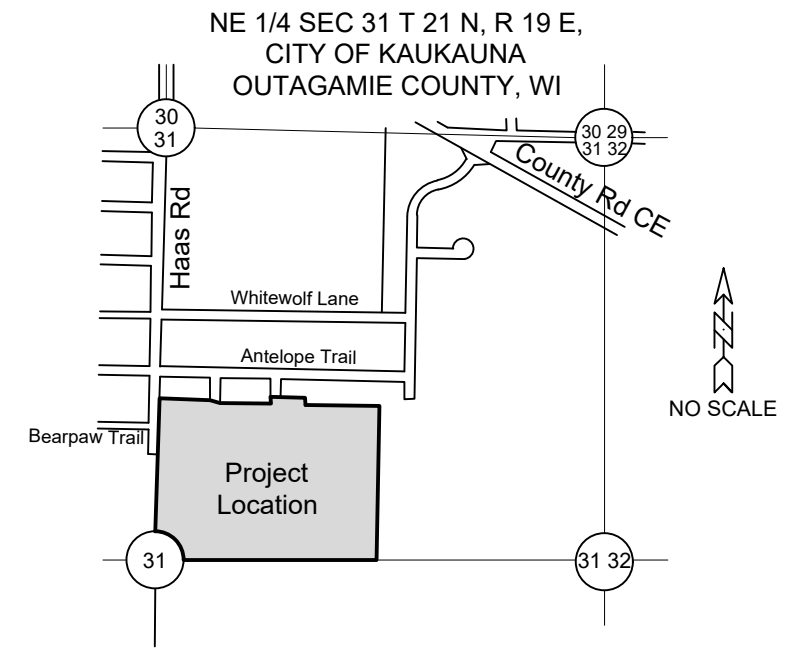
File: 4198Ease5.dwg  
Date: 05/03/2024  
Drafted By: Jim  
Sheet: 3 of 3



# Blue Stem Meadows 3

Part of Lot 3 and all of Lot 4, Certified Survey Map 7779, being located in Southwest 1/4 of the Northeast 1/4, Section 31, Township 21 North, Range 19 East, City of Kaukauna, Outagamie County, Wisconsin

### LOCATION MAP



Bearings are referred to the South line of the Northeast 1/4, Section 31, T21N, R19E, assumed to bear N89°04'10"W, base on the Outagamie County Coordinate System.

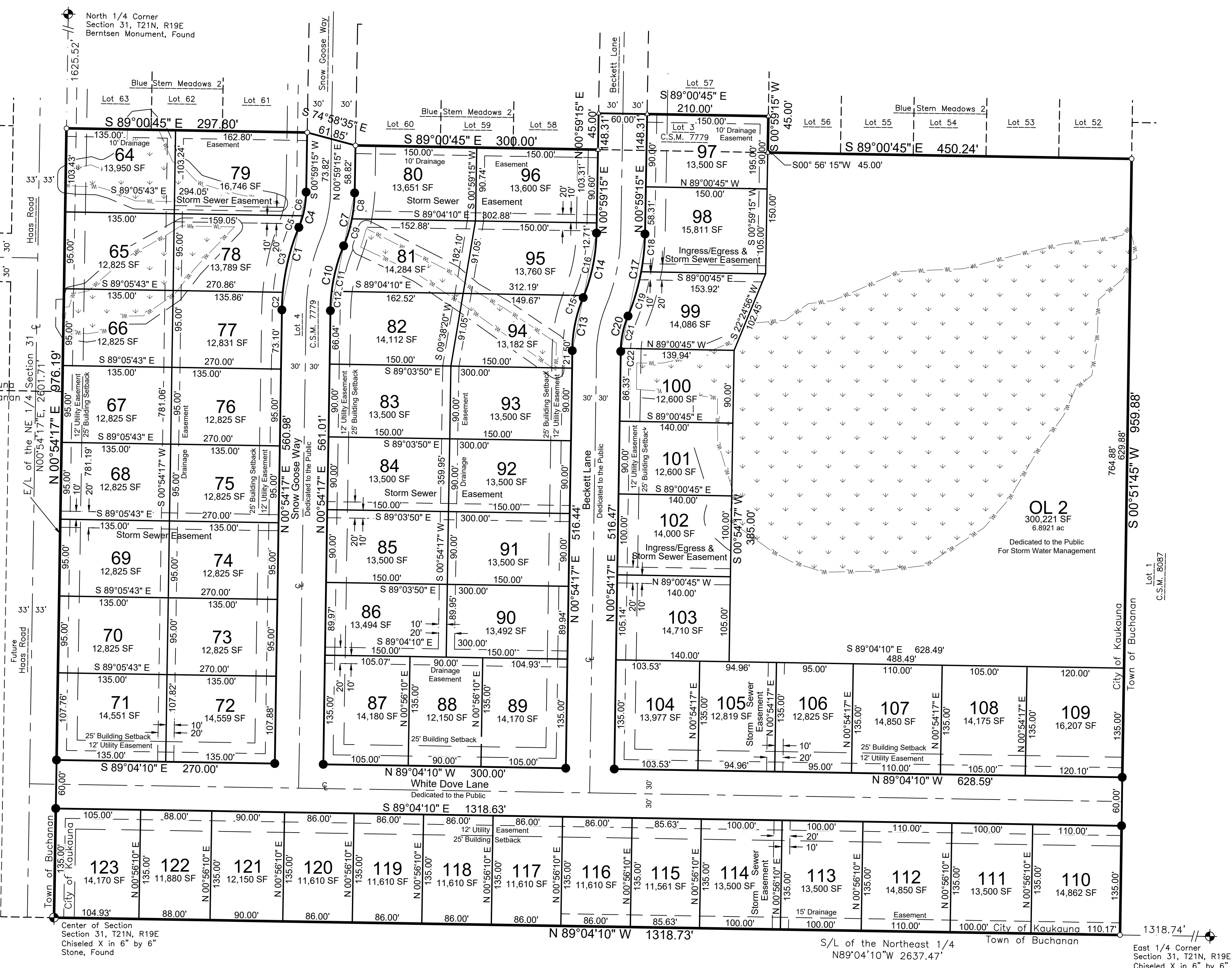
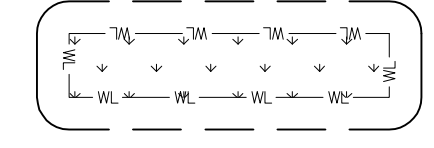
### NOTES

1. All linear measurements have been made to the nearest one hundredth of a foot.
2. All bearings are computed and measured to the nearest second.
3. Lots 67-70 are un-buildable until such time as the future Haas Road is dedicated and improvements are accepted by the City of Kaukauna.

### LEGEND

- △ 1/4" Rebar Found
- ◻ 3/4" Rebar Found
- 2.3" O.D. x 18" Steel Iron Pipe @ 3.65 lbs/LF SET
- All other corners
- 3/4" x 18" Steel Rebar @ 1.50lbs/LF SET
- SF Lot areas in square feet

Delineated Wetlands  
W/10' Protective Buffer



CURVE TABLE						
Curve	Radius	Chord Direction	Chord Length	Arc Length	Central Angle	Tangent Bearing-in / Tangent Bearing-out
C1	280.00'	N 11°37'42" E	104.20'	104.81'	21°26'50"	N 00°54'17" E / N 22°21'07" E
C2	280.00'	S 03°08'51" W	21.92'	21.92'	4°29'08"	S 00°54'17" W / S 05°23'25" W
C3	280.00'	S 13°52'16" W	82.59'	82.89'	16°57'42"	S 05°23'25" W / S 22°21'07" W
C4	120.00'	N 11°40'11" E	44.49'	44.75'	21°21'52"	N 22°21'07" E / N 00°59'15" E
C5	120.00'	N 18°42'33" E	15.25'	15.26'	7°17'08"	N 22°21'07" E / N 15°03'59" E
C6	120.00'	N 08°01'37" E	29.41'	29.49'	14°04'44"	N 15°03'59" E / N 00°59'15" E
C7	180.00'	N 11°40'11" E	66.73'	67.12'	21°21'52"	N 22°21'07" E / N 00°59'15" E
C8	180.00'	N 06°06'59" E	32.18'	32.23'	10°15'27"	N 11°14'42" E / N 00°59'15" E
C9	180.00'	N 16°47'55" E	34.84'	34.89'	11°06'25"	N 22°21'07" E / N 11°14'42" E
C10	220.00'	N 11°37'42" E	81.87'	82.35'	21°26'50"	N 00°54'17" E / N 22°21'07" E
C11	220.00'	N 14°45'17" E	58.17'	58.34'	15°11'40"	N 07°09'27" E / N 22°21'07" E
C12	220.00'	N 04°01'52" E	24.00'	24.01'	6°15'10"	N 00°54'17" E / N 07°09'27" E
C13	180.00'	N 11°36'56" E	66.91'	67.30'	21°25'19"	N 00°54'17" E / N 22°19'36" E
C14	220.00'	N 11°39'25" E	81.46'	81.94'	21°20'21"	N 22°19'36" E / N 00°59'15" E
C15	220.00'	S 21°56'36" W	2.94'	2.94'	0°46'01"	S 22°19'36" W / S 21°33'55" W
C16	220.00'	N 11°16'25" E	78.57'	78.99'	20°34'20"	N 21°33'35" E / N 00°59'15" E
C17	280.00'	N 11°39'25" E	103.68'	104.28'	21°20'21"	N 22°19'36" E / N 00°59'15" E
C18	280.00'	N 05°47'14" E	48.86'	49.91'	9°35'58"	N 10°35'13" E / N 00°59'15" E
C19	280.00'	N 16°27'24" E	57.27'	57.37'	11°44'23"	N 22°19'36" E / N 10°35'13" E
C20	120.00'	N 11°36'56" E	44.61'	44.87'	21°25'19"	N 00°54'17" E / N 22°19'36" E
C21	120.00'	N 12°29'30" E	40.99'	41.20'	19°40'11"	N 02°39'25" E / N 22°19'36" E
C22	120.00'	N 01°46'51" E	3.67'	3.67'	1°45'08"	N 00°54'17" E / N 02°39'25" E

There are no objections to this plat with respect to Secs. 236.15, 236.16, 236.20 and 236.21(1) and (2), Wis. Stats. as provided by s. 236.12, Wis. Stats.

Certified \_\_\_\_\_, 20\_\_\_\_  
Department of Administration



James R. Schloff PLS 2692 Date \_\_\_\_\_

File: 4198Final3.dwg  
Date: 01/09/2023  
Drafted By: Jim  
Sheet: 1 of 2  
Revision Date: Jan 09, 2023



**DAVEL ENGINEERING & ENVIRONMENTAL, INC.**  
Civil Engineers and Land Surveyors  
1164 Province Terrace, Menasha, WI 54952  
Ph: 920-991-1866 Fax: 920-441-0804  
www.davel.pro

Jan 09, 2023 - 12:23pm d:\Projects\4198\Drawings\Civil\_3D\4198Final3.dwg Printed by: Jim