

# Hydraulic Calculations

for

Project Name: Cimco Warehouse

Location: 2315 Inter Ave., Puyallup, WA. 98372,

Drawing Name: Cimco Warehouse

Calculation Date: 1/29/2024

## Design

Remote Area Number: 1  
Remote Area Location: Storage  
Occupancy Classification: Spec. Warehouse  
Commodity Classification: Class III  
  
Density: 0.24gpm/ft<sup>2</sup>  
Area of Application: 2071ft<sup>2</sup> (Actual 2071ft<sup>2</sup>)  
Coverage per Sprinkler: 99ft<sup>2</sup>  
Type of sprinklers calculated: Upright  
No. of sprinklers calculated: 23  
No. of nozzles calculated: 0

In-rack Demand: N/A gpm at Node: N/A  
Hose Streams: 500.00 at Node: 13 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 13: 1216.14 @ 32.397

(Safety Margin = 6.033)

Type of System: Wet

Volume of Dry/PreAction/Antifreeze/OtherAgent N/A



Name of Contractor: Columbia Fire, LLC

Address: 111 S. Findlay Street, Seattle, WA. 98108

Phone Number: 206-232-8569

Name of designer: Matt Barnard

Authority Having Jurisdiction: City of Puyallup

## Notes:

Automatic peaking results Left: N/A Right: N/A

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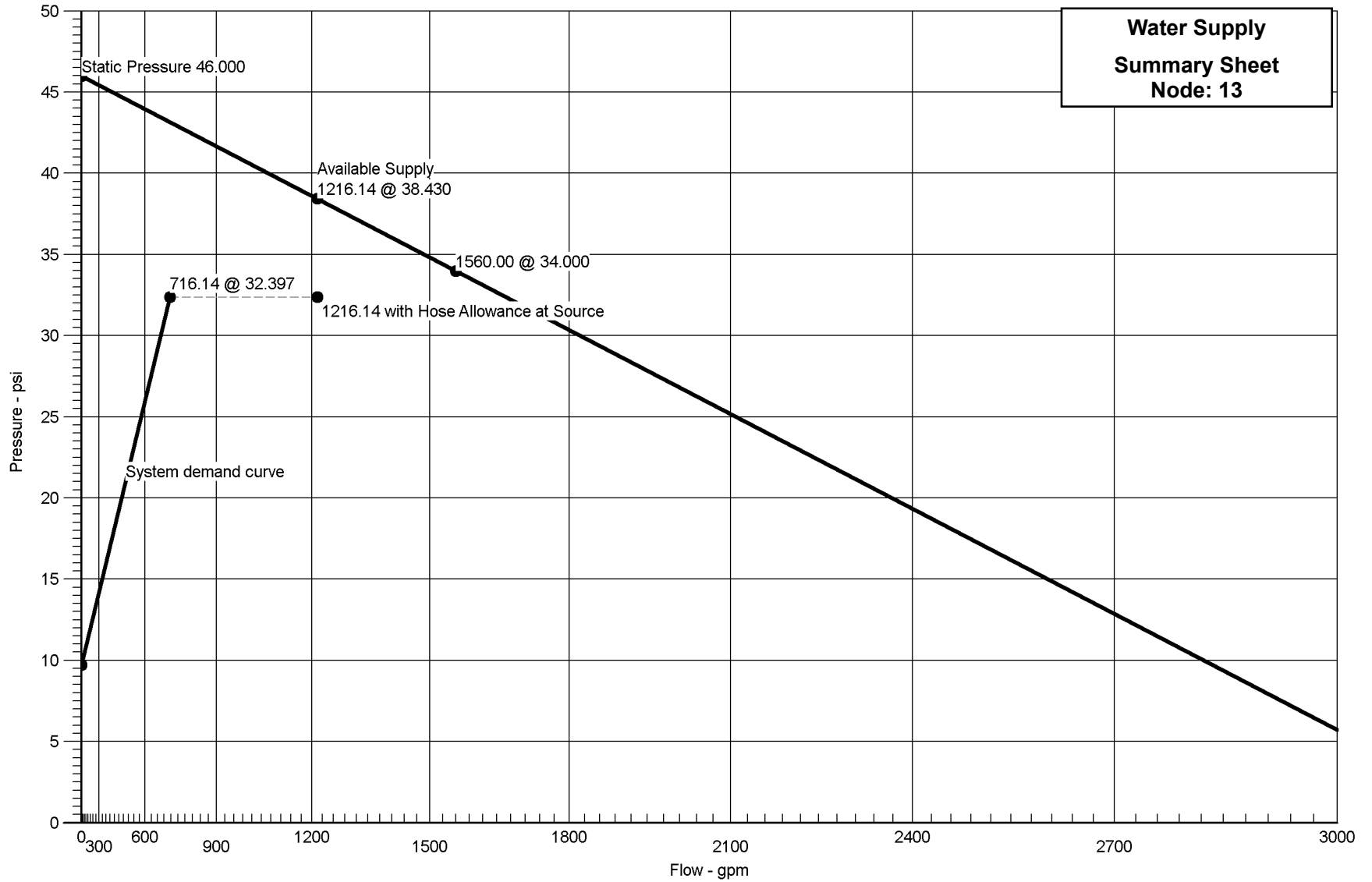
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# Hydraulic Graph

Job Name: Cimco Warehouse  
Remote Area Number: 1

N 1.85

Date: 1/29/2024





# Summary Of Outflowing Devices

Device	Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
⇒ Sprinkler 101	29.63	23.76	11.2	7.000		
Sprinkler 102	30.17	23.76	11.2	7.258		
Sprinkler 103	31.17	23.76	11.2	7.747		
Sprinkler 104	29.66	23.76	11.2	7.013		
Sprinkler 105	30.20	23.76	11.2	7.271		
Sprinkler 106	31.20	23.76	11.2	7.759		
Sprinkler 107	29.76	23.76	11.2	7.058		
Sprinkler 108	30.29	23.76	11.2	7.313		
Sprinkler 109	31.28	23.76	11.2	7.798		
Sprinkler 110	29.89	23.76	11.2	7.121		
Sprinkler 111	30.25	23.76	11.2	7.293		
Sprinkler 112	30.86	23.76	11.2	7.592		
Sprinkler 113	33.40	23.76	11.2	8.893		
Sprinkler 114	33.30	23.76	11.2	8.840		
Sprinkler 115	29.92	23.76	11.2	7.134		
Sprinkler 116	30.28	23.76	11.2	7.307		
Sprinkler 117	30.89	23.76	11.2	7.607		
Sprinkler 118	30.01	23.76	11.2	7.180		
Sprinkler 119	30.37	23.76	11.2	7.354		
Sprinkler 120	31.00	23.76	11.2	7.659		
Sprinkler 121	34.18	23.76	11.2	9.312		
Sprinkler 122	34.20	23.76	11.2	9.322		
Sprinkler 123	34.26	23.76	11.2	9.355		

⇒ Most Demanding Sprinkler Data

## Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
	Node 2		Elev 2 (Foot)	Total Flow (Q)		Actual ID	Equiv. Length (Foot)	Pf Friction Loss Per Unit (psi)		Elev(Pe)
		Total (Foot)	Friction(Pf)							
101	19'-5½	11.2	29.63	2	(See Notes)	8'-3	120	7.000		••••• Route 1 ••••• Sprinkler
102	19'-2		41.81	2.1570		8'-3	0.015209	0.132		
102	19'-2	11.2	30.17	2	(See Notes)	8'-3	120	7.258	Sprinkler	
103	18'-10		71.98	2.1570		8'-3	0.041557	0.146		
103	18'-10	11.2	31.17	2	(See Notes)	7'-0½	120	7.747	Sprinkler, T(12'-3½)	
1	18'-6½		103.15	2.1570		12'-3½	0.080861	0.124		
						19'-4		1.564		
1	18'-6½		34.18	2	(See Notes)	2'-0½	120	9.434	Flow (q) from Route 10 PO(12'-3½)	
2	16'-6		137.33	2.1570		12'-3½	0.137301	0.879		
						14'-4		1.968		
2	16'-6			6		12'-0	120	12.282		
3	16'-6		137.33	6.3570		12'-0	0.000711	0.009		
3	16'-6		137.28	6		11'-0	120	12.291	Flow (q) from Route 2	
4	16'-6		274.61	6.3570		11'-0	0.002561	0.028		
4	16'-6		137.10	6		12'-0	120	12.319	Flow (q) from Route 3	
5	16'-6		411.71	6.3570		12'-0	0.005418	0.065		
5	16'-6		68.69	6		8'-6	120	12.384	Flow (q) from Route 5	
6	16'-6		480.40	6.3570		8'-6	0.007207	0.061		
6	16'-6		56.88	6		12'-0	120	12.445	Flow (q) from Route 13	
7	16'-6		537.28	6.3570		12'-0	0.008865	0.106		
7	16'-6		56.99	6		7'-6	120	12.552	Flow (q) from Route 14	
8	16'-6		594.27	6.3570		7'-6	0.010683	0.080		
8	16'-6		57.58	6	(See Notes)	11'-1	120	12.632	Flow (q) from Route 15 T(37'-8½)	
9	16'-6		651.85	6.3570		37'-8½	0.012676	0.008		
						48'-10		0.619		

## Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
	Node 2		Elev 2 (Foot)	Total Flow (Q)		Actual ID	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	
		Total (Foot)			Friction(Pf)				
9	16'-6		64.29	6	(See Notes)	19'-3½	120	13.258	
10	0'-8½		716.14	6.3570		30'-2	0.015085	6.846	
						49'-5½		0.746	
10	0'-8½			8	(See Notes)	186'-9½	140	20.851	E(30'-6½), 3EE(15'-3)
11	-3'-0		716.14	8.3900		76'-4	0.002936	1.608	
						263'-1½		0.773	
11	-3'-0			6	(See Notes)	165'-0½	140	23.231	
12	-3'-0		716.14	6.2800			0.012036		
						165'-0½		8.987	
12	-3'-0			8	(See Notes)	47'-7	140	32.217	PIV(6'-9½), GV(6'-9½), S
13	-3'-0		716.14	8.3900		13'-7	0.002936		
						61'-1½		0.180	
			500.00					32.397	
13			1216.14						Total(Pt) Route 1
104	19'-5½	11.2	29.66	2	(See Notes)	8'-3	120	7.013	••••• Route 2 ••••• Sprinkler
105	19'-2		41.68	2.1570			0.015127	0.132	
						8'-3		0.125	
105	19'-2	11.2	30.20	2	(See Notes)	8'-3	120	7.271	
106	18'-10		71.88	2.1570			0.041455	0.146	
						8'-3		0.342	
106	18'-10	11.2	31.20	2	(See Notes)	7'-0½	120	7.759	Sprinkler, T(12'-3½)
14	18'-6½		103.08	2.1570			0.080757	0.124	
						19'-4		1.562	
14	18'-6½		34.20	2	(See Notes)	2'-0½	120	9.444	
3	16'-6		137.28	2.1570			0.137202	0.879	
						14'-4		1.967	
								12.291	Total(Pt) Route 2
107	19'-5½	11.2	29.76	2	(See Notes)	8'-3	120	7.058	••••• Route 3 ••••• Sprinkler
108	19'-2		41.28	2.1570			0.014856	0.132	
						8'-3		0.123	
108	19'-2	11.2	30.29	2	(See Notes)	8'-3	120	7.313	
109	18'-10		71.57	2.1570			0.041116	0.146	
						8'-3		0.339	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
109	18'-10	11.2	31.28	2	(See Notes)	7'-0½	120	7.798	Sprinkler, T(12'-3½)
15	18'-6½		102.84	2.1570		12'-3½	0.080412	0.124	
						19'-4		1.555	
15	18'-6½		34.26	2	(See Notes)	2'-0½	120	9.477	Flow (q) from Route 12 PO(12'-3½)
						12'-3½	0.136871	0.879	
4	16'-6		137.10	2.1570		14'-4		1.962	
								12.319	Total(Pt) Route 3
110	19'-2	11.2	29.89	2	(See Notes)	8'-3	120	7.121	***** Route 4 ***** Sprinkler
							0.001552	-0.133	
101	19'-5½		12.17	2.1570		8'-3		0.013	
								7.000	Total(Pt) Route 4
110	19'-2	11.2	29.89	2	(See Notes)	8'-3	120	7.121	***** Route 5 ***** Sprinkler
							0.003105	0.147	
111	18'-10		17.71	2.1570		8'-3		0.026	
111	18'-10	11.2	30.25	2	(See Notes)	8'-0	120	7.293	Sprinkler
							0.019606	0.142	
112	18'-6		47.96	2.1570		8'-0		0.157	
112	18'-6	11.2	30.86	2	(See Notes)	2'-9	120	7.592	Sprinkler, E(6'-2), PO(12'-3½)
						18'-5½	0.049154	0.859	
16	16'-6		78.82	2.1570		21'-2½		1.042	
16	16'-6			4		12'-0	120	9.494	
							0.001787		
17	16'-6		78.82	4.2600	12'-0	0.021			
17	16'-6		79.06	4		11'-0	120	9.515	Flow (q) from Route 7
							0.006461		
18	16'-6		157.88	4.2600	11'-0	0.071			
18	16'-6		79.86	4		12'-0	120	9.586	Flow (q) from Route 9
							0.013778		
19	16'-6		237.73	4.2600	12'-0	0.165			
19	16'-6			2	(See Notes)	2'-9	120	9.751	PO(12'-3½) E(6'-2)
						18'-5½	0.000054	-0.859	
113	18'-6		1.99	2.1570		21'-2½		0.001	

## Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
	Node 2		Elev 2 (Foot)	Total Flow (Q)		Actual ID	Fitting (Foot)	Pf Friction Loss Per Unit (psi)		Elev(Pe)
							Friction(Pf)			
113	18'-6	11.2	33.40	2	(See Notes)	8'-0	120	8.893		Sprinkler
114	18'-10		35.39	2.1570		8'-0	0.011174	-0.142		
5	16'-6		68.69	2.1570			0.089	12.384	Total(Pt) Route 5	
114	18'-10	11.2	33.30	2	(See Notes)	42'-1	120	8.840	Sprinkler, T(12'-3½), PO(12'-3½)	
						24'-7½	0.038112	1.002		
						66'-8½		2.542		
115	19'-2	11.2	29.92	2	(See Notes)	8'-3	120	7.134	***** Route 6 ***** Sprinkler	
104	19'-5½		12.02	2.1570		8'-3	0.001517	-0.133		
								0.013		7.013
115	19'-2	11.2	29.92	2	(See Notes)	8'-3	120	7.134	***** Route 7 ***** Sprinkler	
116	18'-10		17.89	2.1570		8'-3	0.003164	0.147		
							0.026			
116	18'-10	11.2	30.28	2	(See Notes)	8'-0	120	7.307	Sprinkler	
117	18'-6		48.17	2.1570		8'-0	0.019765	0.142		
							0.158			
117	18'-6	11.2	30.89	2	(See Notes)	2'-9	120	7.607	Sprinkler, E(6'-2), PO(12'-3½)	
						18'-5½	0.049432	0.859		
17	16'-6		79.06	2.1570		21'-2½		1.048		
								9.515	Total(Pt) Route 7	
118	19'-2	11.2	30.01	2	(See Notes)	8'-3	120	7.180	***** Route 8 ***** Sprinkler	
107	19'-5½		11.52	2.1570		8'-3	0.001402	-0.133		
								0.012		7.058
118	19'-2	11.2	30.01	2	(See Notes)	8'-3	120	7.180	***** Route 9 ***** Sprinkler	
119	18'-10		18.49	2.1570		8'-3	0.003361	0.147		
							0.028			
119	18'-10	11.2	30.37	2	(See Notes)	8'-0	120	7.354	Sprinkler	
120	18'-6		48.86	2.1570		8'-0	0.020294	0.142		
								0.162		

## Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
										Node 2
120	18'-6	11.2	31.00	2	(See Notes)	2'-9	120	7.659		
18	16'-6		79.86	2.1570		18'-5½	0.050358	0.859		
						21'-2½		1.068		
								9.586	Total(Pt) Route 9	
121	18'-6	11.2	34.18	2	(See Notes)	0'-11½	120	9.312	..... Route 10 ..... Sprinkler, T(12'-3½)	
1	18'-6½		34.18	2.1570		12'-3½	0.010477	-0.017		
						13'-3½		0.139		
								9.434		Total(Pt) Route 10
122	18'-6	11.2	34.20	2	(See Notes)	0'-11½	120	9.322	..... Route 11 ..... Sprinkler, T(12'-3½)	
14	18'-6½		34.20	2.1570		12'-3½	0.010487	-0.017		
						13'-3½		0.139		
								9.444		Total(Pt) Route 11
123	18'-6	11.2	34.26	2	(See Notes)	0'-11½	120	9.355	..... Route 12 ..... Sprinkler, T(12'-3½)	
15	18'-6½		34.26	2.1570		12'-3½	0.010521	-0.017		
						13'-3½		0.140		
								9.477		Total(Pt) Route 12
19	16'-6		1.99	4		8'-6	120	9.751	..... Route 13 ..... Flow (q) from Route 5	
20	16'-6		235.74	4.2600		8'-6	0.013566	0.115		
20	16'-6			2	(See Notes)	52'-10		120		9.867
6	16'-6		56.88	2.1570		43'-1	0.026886	-0.000		
						95'-11		2.579		
								12.445	Total(Pt) Route 13	
20	16'-6		56.88	4		12'-0	120	9.867	..... Route 14 ..... Flow (q) from Route 13	
21	16'-6		178.86	4.2600		12'-0	0.008139	0.098		
21	16'-6			2	(See Notes)	52'-10		120		9.964
7	16'-6		56.99	2.1570		43'-1	0.026977	-0.000		
						95'-11		2.587		
								12.552	Total(Pt) Route 14	
21	16'-6		56.99	4		7'-6	120	9.964	..... Route 15 ..... Flow (q) from Route 14	
22	16'-6		121.87	4.2600		7'-6	0.004003	0.030		



## Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Total (Foot)	Friction(Pf)								
		22	16'-6			2	(See Notes)	52'-10	
8	16'-6		57.58	2.1570		43'-1	0.027499	-0.000	
						95'-11		2.638	
								12.632	Total(Pt) Route 15
22	16'-6		57.58	4		12'-0	120	9.994	..... Route 16 ..... Flow (q) from Route 15
23	16'-6		64.29	4.2600		12'-0	0.001226	0.015	
23	16'-6			2	(See Notes)	52'-10½		120	10.009
24	16'-6		64.29	2.1570		43'-1	0.033720	0.008	
						95'-11		3.235	
24	16'-6			6	(See Notes)	0'-11	120	13.252	T(37'-8½)
9	16'-6		64.29	6.3570		37'-8½	0.000175	0.007	
						38'-7½			
								13.258	Total(Pt) Route 16

**Equivalent Pipe Lengths of Valves and Fittings (C=120 only)**

**C Value Multiplier**

$$\left( \frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

**Fittings Legend**

ALV Alarm Valve	AngV Angle Valve	b Bushing
BaIV Ball Valve	BFP Backflow Preventer	BV Butterfly Valve
C Cross Flow Turn 90°	cplg Coupling	Cr Cross Run
CV Check Valve	DelV Deluge Valve	DPV Dry Pipe Valve
E 90° Elbow	EE 45° Elbow	Ee1 11¼° Elbow
Ee2 22½° Elbow	f Flow Device	fd Flex Drop
FDC Fire Department Connection	fE 90° FireLock(TM) Elbow	fEE 45° FireLock(TM) Elbow
flg Flange	FN Floating Node	fT FireLock(TM) Tee
g Gauge	GloV Globe Valve	GV Gate Valve
Ho Hose	Hose Hose	HV Hose Valve
Hyd Hydrant	LtE Long Turn Elbow	mecT Mechanical Tee
Noz Nozzle	P1 Pump In	P2 Pump Out
PIV Post Indicating Valve	PO Pipe Outlet	PrV Pressure Relief Valve
PRV Pressure Reducing Valve	red Reducer/Adapter	S Supply
sCV Swing Check Valve	SFx Seismic Flex	Spr Sprinkler
St Strainer	T Tee Flow Turn 90°	Tr Tee Run
U Union	WirF Wirsbo	WMV Water Meter Valve
Z Cap		

# TOLBrace™ Seismic Bracing Calculations

V8.8.124

**Project Address:** Cimco Warehouse  
2315 Inter Ave.  
Puyallup, WA. 98372  
 Job # \_\_\_\_\_

**Contractor:** Columbia Fire  
**Address:** 111 S. Findlay St  
Seattle, WA. 9810  
**Phone:** 206-232-8569  
**Licence:** COLUMFL795NJ

Expires  
DEC 31, 24

WASHINGTON STATE  
CERTIFICATE OF COMPETENCY  
FIRE SPRINKLER SYSTEMS

Matthew William Kunkle  
4960-0322-C LEVEL 3  
Columbia Fire, LLC  
COLUMFL795NJ

01/29/2024

Signature
Date

Calculations based on 2019 NFPA Pamphlet #13

Brace Information	TOLCO™ Brace Components												
<p><b>Maximum Brace Length</b> <u>7' 0" (2.134 m)</u></p> <p><b>Diameter of Brace</b> <u>1"</u></p> <p><b>Type of Brace</b> <u>Sch.40</u></p> <p><b>Angle of Brace</b> <u>45° Min.</u></p> <p><b>Least Rad. of Gyration</b> <u>0.42" (11 mm)</u></p> <p><b>L/R Value</b> <u>200</u></p> <p><b>Max Horizontal Load</b> <u>1310 lbs (594 kg)</u></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;">TOLCO™ Component</th> <th style="width: 20%;">Listed Load</th> <th style="width: 45%;">Adjusted Load</th> </tr> </thead> <tbody> <tr> <td>Fig. 1001 Clamp</td> <td>2000 lbs (907 kg)</td> <td>1414 lbs (641 kg)</td> </tr> <tr> <td>Fig.980 - 1/2" Universal Swive</td> <td>2100 lbs (953 kg)</td> <td>1485 lbs (674 kg)</td> </tr> <tr> <td>Fig.828 Along 1/2" - 7/8" Thic</td> <td>1370 lbs (621 kg)</td> <td>968 lbs (439 kg)</td> </tr> </tbody> </table> <p style="font-size: 8px; text-align: center;">*Calculation Based on CONCENTRIC Loading                      *Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.</p>	TOLCO™ Component	Listed Load	Adjusted Load	Fig. 1001 Clamp	2000 lbs (907 kg)	1414 lbs (641 kg)	Fig.980 - 1/2" Universal Swive	2100 lbs (953 kg)	1485 lbs (674 kg)	Fig.828 Along 1/2" - 7/8" Thic	1370 lbs (621 kg)	968 lbs (439 kg)
TOLCO™ Component	Listed Load	Adjusted Load											
Fig. 1001 Clamp	2000 lbs (907 kg)	1414 lbs (641 kg)											
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Fig.828 Along 1/2" - 7/8" Thic	1370 lbs (621 kg)	968 lbs (439 kg)											
<b>Fastener Information</b>	<b>Seismic Brace Assembly Detail</b>												
<p><b>Orientation to Connecting Surface</b> <u>NFPA Type B</u></p> <p><b>Fastener Type</b> <u>Fig.828 Along 1/2" - 7/8" Thick Fla</u></p> <p><b>Diameter</b> <u>N/A</u></p> <p><b>Length</b> <u>N/A</u></p> <p><b>Maximum Load</b> <u>1370 lbs (621 kg)</u></p> <p><b>Prying Factor</b> <u>N/A</u></p>													
	<p><b>Brace Identification on Plans</b> Lateral SB-A</p> <p><b>Brace Type</b> Lateral <input checked="" type="checkbox"/> Longitudinal <input type="checkbox"/> 4-Way <input type="checkbox"/></p>												

Sprinkler System Load Calculation (Fpw = CpWp)					
Cp = <u>0.61</u>					
Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
6" (150 mm)	Sch. 10	25 ft (7.6 m)	25 ft (7.6 m)	23.03 lb/ft (34.27 kg/m)	576 lbs (261 kg)
2" (50 mm)	Sch. 10	60 ft (18.3 m)	60 ft (18.3 m)	4.22 lb/ft (6.28 kg/m)	253 lbs (115 kg)
Subtotal Weight					829 lbs (376 kg)
Wp (incl. 15%)					953 lbs (432 kg)
<b>Main Size</b>	<b>Type/Sch.</b>	<b>Spacing (ft)</b>	<b>Total (Fpw)</b>		582 lbs (264 kg)
6"	Sch. 10	25	<b>Maximum Fpw per 18.5.5.2 (if applicable)</b>		3231 lb (1465 kg)

# TOLBrace™ Seismic Calculations

Cimco Warehouse

Job #

2315 Inter Ave.



Brace Identification	Lateral SB-A
Brace Type (Per NFPA#13)	NFPA Type B
Braced Pipe (ft)	6" Sch.10 Steel Pipe
Spacing of Brace	25' 0" (7.62 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	45°
Type of Fastener	Fig.828 Along 1/2" - 7/8" Thick Flange Beam
Length of Fastener	N/A

## Summary of Pipe within Zone of Influence

6" Sch.10 Steel Pipe (152.4 mm)	25 ft (7.6 m)
2" Sch.10 Steel Pipe (50.8 mm)	60 ft (18.3 m)

G-Factor Used 0.61

Allowance for Heads and Fittings 15%

### Conclusions

Total Adjusted Load of Pipe in Zone of Influence	582 lbs (264 kg)
Material Capacity	1310 lbs (594 kg)
Fastener Capacity	969 lbs (439 kg)
Fig. 1001 Clamp	1414 lbs (641 kg)
Fig.980 - 1/2" Universal Swivel	1485 lbs (674 kg)
Structural Member	Steel

Calculations prepared by Matt Barnard

\* The description of the Structural Member is for informational purposes only.  
 TOLBrace™ software calculates the brace assembly only, not the structure it is attached to.  
 Calculated with TOLBrace™ 8  
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# TOLBrace™ Seismic Bracing Calculations

V8.8.124

**Project Address:** Cimco Warehouse  
2315 Inter Ave.  
Puyallup, WA. 98372  
 Job # \_\_\_\_\_

**Contractor:** Columbia Fire  
**Address:** 111 S. Findlay Street  
Seattle, WA. 98108  
**Phone:** 206-232-8569  
**Licence:** COLUMFL795NJ



Calculations based on 2019 NFPA Pamphlet #13

Brace Information	TOLCO™ Brace Components												
<b>Maximum Brace Length</b> <u>7' 0" (2.134 m)</u> <b>Diameter of Brace</b> <u>1"</u> <b>Type of Brace</b> <u>Sch.40</u> <b>Angle of Brace</b> <u>45° Min.</u> <b>Least Rad. of Gyration</b> <u>0.42" (11 mm)</u> <b>L/R Value</b> <u>200</u> <b>Max Horizontal Load</b> <u>1310 lbs (594 kg)</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TOLCO™ Component</th> <th>Listed Load</th> <th>Adjusted Load</th> </tr> </thead> <tbody> <tr> <td>Fig. 4L Clamp</td> <td>2000 lbs (907 kg)</td> <td>1414 lbs (641 kg)</td> </tr> <tr> <td>Fig.980 - 1/2" Universal Swive</td> <td>2100 lbs (953 kg)</td> <td>1485 lbs (674 kg)</td> </tr> <tr> <td>Fig.828 Across 1/2" - 7/8" Thi</td> <td>1370 lbs (621 kg)</td> <td>968 lbs (439 kg)</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">*Calculation Based on CONCENTRIC Loading                      *Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.</p>	TOLCO™ Component	Listed Load	Adjusted Load	Fig. 4L Clamp	2000 lbs (907 kg)	1414 lbs (641 kg)	Fig.980 - 1/2" Universal Swive	2100 lbs (953 kg)	1485 lbs (674 kg)	Fig.828 Across 1/2" - 7/8" Thi	1370 lbs (621 kg)	968 lbs (439 kg)
TOLCO™ Component	Listed Load	Adjusted Load											
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Fig.980 - 1/2" Universal Swive	2100 lbs (953 kg)	1485 lbs (674 kg)											
Fig.828 Across 1/2" - 7/8" Thi	1370 lbs (621 kg)	968 lbs (439 kg)											
<b>Fastener Information</b>	<b>Seismic Brace Assembly Detail</b>												
<b>Orientation to Connecting Surface</b> <u>NFPA Type B</u> <b>Fastener Type</b> <u>Fig.828 Across 1/2" - 7/8" Thick Fl</u> <b>Diameter</b> <u>N/A</u> <b>Length</b> <u>N/A</u> <b>Maximum Load</b> <u>1370 lbs (621 kg)</u> <b>Prying Factor</b> <u>N/A</u>													
	<b>Brace Identification on Plans</b> Longitudinal SB-B <b>Brace Type</b> Lateral [ ] Longitudinal [X] 4-Way [ ]												

### Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.61

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
6" (150 mm)	Sch. 10	50 ft (15.2 m)	50 ft (15.2 m)	23.03 lb/ft (34.27 kg/m)	1152 lbs (523 kg)
Subtotal Weight					1152 lbs (523 kg)
Wp (incl. 15%)					1325 lbs (601 kg)
<b>Main Size</b> 6"	<b>Type/Sch.</b> Sch. 10	<b>Spacing (ft)</b> 50	<b>Total (Fpw)</b>		808 lbs (367 kg)
<b>Maximum Fpw per 18.5.5.2 (if applicable)</b>					N/A

# TOLBrace™ Seismic Calculations

Cimco Warehouse

Job #

2315 Inter Ave.



Brace Identification	Longitudinal SB-B
Brace Type (Per NFPA#13)	NFPA Type B
Braced Pipe (ft)	6" Sch.10 Steel Pipe
Spacing of Brace	50' 0" (15.24 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	45°
Type of Fastener	Fig.828 Across 1/2" - 7/8" Thick Flange Beam
Length of Fastener	N/A

## Summary of Pipe within Zone of Influence

6" Sch.10 Steel Pipe (152.4 mm)	50 ft (15.2 m)

G-Factor Used 0.61

Allowance for Heads and Fittings 15%

### Conclusions

Total Adjusted Load of Pipe in Zone of Influence	808 lbs (367 kg)
Material Capacity	1310 lbs (594 kg)
Fastener Capacity	969 lbs (439 kg)
Fig. 4L Clamp	1414 lbs (641 kg)
Fig.980 - 1/2" Universal Swivel	1485 lbs (674 kg)
Structural Member	Steel

Calculations prepared by Matt Barnard

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