Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

. . . Fire Protection by Computer Design

HIGH TECH FIRE PROTECTION
84 HACKETT MILLS ROAD
P.O. BOX 156
POLAND, ME 04274
207-998-2551

| | | |
|---|---|---|
| Job Name | : | 667 Congress Street 1st floor dry #1B |
| Drawing | : | FP-01 |
| Location | : | 1st Floor Parking Garage |
| Remote Area | : | #1B |
| Contract | : | 091815-1 |
| Data File | : | 1st floor dry calc #1B.WXF |

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

## *HYDRAULIC CALCULATIONS*
## *for*

***Project name:*** 667 Congress Street 1st floor Parking Garage
***Location:*** 1st Floor Parking Garage
***Drawing no:*** FP-01
***Date:*** 6-29-16

***Design***

***Remote area number:*** #1B
***Remote area location:*** 1st floor parking garage
***Occupancy classification:*** Ordinary Hazard Group 1
***Density:*** .15 - Gpm/SqFt
***Area of application:*** 1950 - SqFt
***Coverage per sprinkler:*** 130 - SqFt
***Type of sprinklers calculated:*** dry quick response pendent
***No. of sprinklers calculated:*** 18
***In-rack demand:*** n/a - GPM
***Hose streams:*** 250 - GPM
***Total water required (including hose streams):*** 646 - GPM @ 43 - Psi
***Type of system:*** Dry
***Volume of dry or preaction system:*** 520 - Gal

***Water supply information***

***Date:*** 8-8-14
***Location:*** Congress Street Front of Building
***Source:*** Portand Water District

***Name of contractor:*** HIGH TECH FIRE PROTECTION
***Address:*** 84 HACKETT MILLS ROAD / P.O. BOX 156 / POLAND, ME 04274
***Phone number:*** 207-998-2551
***Name of designer:*** Ed Poulin
***Authority having jurisdiction:*** State of Maine / City of Portland
***Notes: (Include peaking information or gridded systems here.)***

# Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
667 Congress Street 1st floor dry #1B

Pag
Date

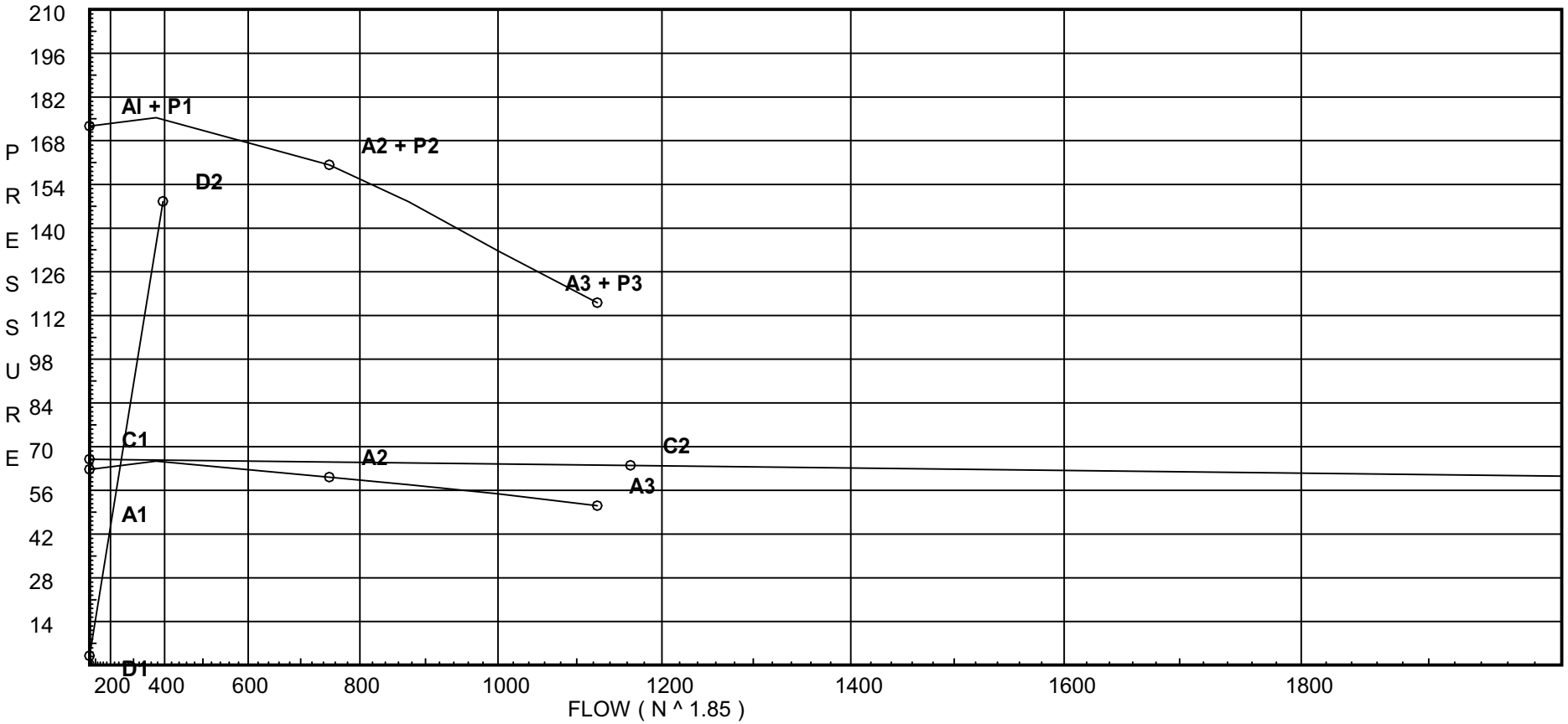
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

City Water Supply:
- C1 - Static Pressure : 66
- C2 - Residual Pressure: 64
- C2 - Residual Flow : 1164

City Water Adjusted to Pump Inlet
for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 62.684
- A2 - Adj Resid : 60.229 @ 750
- A3 - Adj Resid : 51.109 @ 1125

Pump Data:
- P1 - Pump Churn Pressure : 110
- P2 - Pump Rated Pressure : 100
- P2 - Pump Rated Flow : 750
- P3 - Pump Pressure @ Max Flow : 65
- P3 - Pump Max Flow : 1125
- City Residual Flow @ 0 = 7704.98
- City Residual Flow @ 20 = 6339.02
- City Water @ 150% of Pump = 64.12

Demand:
- D1 - Elevation : 3.032
- D2 - System Flow : 395.68
- D2 - System Pressure : 148.491
- Hose ( Demand ) : _____
- D3 - System Demand : 395.68
- Hose ( Adj City ) : 250
- Safety Margin : 22.972



# Fittings Used Summary

HIGH TECH FIRE PROTECTION
667 Congress Street 1st floor dry #1B



RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

Fitting Legend

| Abbrev. | Name | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dvc | Dry Vic 768 NXT | | | | | 3 | 9 | 8 | 17 | | 21 | | 22 | 50 | | | | | | | |
| E | NFPA 13 90' Standard Elbow | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 14 | 18 | 22 | 27 | 35 | 40 | 45 | 50 | 61 |
| G | NFPA 13 Gate Valve | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 13 |
| S | NFPA 13 Swing Check | 0 | 0 | 5 | 7 | 9 | 11 | 14 | 16 | 19 | 22 | 27 | 32 | 45 | 55 | 65 | | | | | |
| T | NFPA 13 90' Flow thru Tee | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 15 | 17 | 20 | 25 | 30 | 35 | 50 | 60 | 71 | 81 | 91 | 101 | 121 |
| V | 90' Ell Firelock #001 | 0 | 0 | 0 | 0 | 3.5 | 3.5 | 4.3 | 5 | 0 | 6.8 | 8.5 | 10 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X | 90'Tee-BranchFirelock002 | 0 | 0 | 0 | 0 | 8.5 | 8.5 | 10.8 | 13 | 0 | 16 | 21 | 25 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zib | Wilkins 350A | Fitting generates a Fixed Loss Based on Flow | | | | | | | | | | | | | | | | | | | |

Units Summary

| | |
|---|---|
| Diameter Units | Inches |
| Length Units | Feet |
| Flow Units | US Gallons per Minute |
| Pressure Units | Pounds per Square Inch |

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

# Pressure / Flow Summary - STANDARD

HIGH TECH FIRE PROTECTION
667 Congress Street 1st floor dry #1B



Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

| Node No. | Elevation | K-Fact | Pt Actual | Pn | Flow Actual | Density | Area |
|---|---|---|---|---|---|---|---|
| DP1 | -1.0 | 5.6 | 12.12 | na | 19.5 | 0.15 | 130 |
| 150 | 10.0 | K = K @ EQ01 | 13.08 | na | 19.5 | | |
| 151 | 10.0 | K = K @ EQ01 | 15.17 | na | 21.0 | | |
| 152 | 10.0 | | 16.72 | na | | | |
| 155 | 10.0 | K = K @ EQ01 | 13.14 | na | 19.54 | | |
| 156 | 10.0 | K = K @ EQ01 | 15.24 | na | 21.05 | | |
| 157 | 10.0 | | 16.8 | na | | | |
| 160 | 10.0 | K = K @ EQ01 | 13.14 | na | 19.54 | | |
| 161 | 10.0 | K = K @ EQ01 | 15.23 | na | 21.04 | | |
| 162 | 10.0 | | 16.79 | na | | | |
| 165 | 10.0 | K = K @ EQ01 | 13.18 | na | 19.58 | | |
| 166 | 10.0 | K = K @ EQ01 | 15.29 | na | 21.08 | | |
| 167 | 10.0 | | 16.85 | na | | | |
| AA | 10.0 | | 17.25 | na | | | |
| 170 | 11.0 | K = K @ EQ01 | 16.9 | na | 22.17 | | |
| 171 | 11.0 | K = K @ EQ01 | 17.23 | na | 22.38 | | |
| 172 | 11.0 | K = K @ EQ01 | 18.43 | na | 23.14 | | |
| 173 | 11.0 | | 19.83 | na | | | |
| 175 | 11.0 | K = K @ EQ01 | 17.06 | na | 22.27 | | |
| 176 | 11.0 | K = K @ EQ01 | 17.39 | na | 22.49 | | |
| 177 | 11.0 | K = K @ EQ01 | 18.6 | na | 23.25 | | |
| 178 | 11.0 | | 20.02 | na | | | |
| 180 | 11.0 | K = K @ EQ01 | 18.4 | na | 23.12 | | |
| 181 | 11.0 | K = K @ EQ01 | 18.75 | na | 23.35 | | |
| 182 | 11.0 | K = K @ EQ01 | 20.04 | na | 24.14 | | |
| 183 | 11.0 | | 21.56 | na | | | |
| 185 | 11.0 | K = K @ EQ01 | 25.17 | na | 27.05 | | |
| 186 | 11.0 | | 26.37 | na | | | |
| 174 | 10.0 | | 21.6 | na | | | |
| 179 | 10.0 | | 21.8 | na | | | |
| AB | 10.0 | | 22.23 | na | | | |
| 184 | 10.0 | | 23.44 | na | | | |
| 187 | 10.0 | | 27.05 | na | | | |
| AC | 10.0 | | 96.82 | na | | | |
| AD | 10.0 | | 114.68 | na | | | |
| AE | -1.5 | | 122.63 | na | | | |
| AF | -1.5 | | 127.16 | na | | | |
| AG | -2.0 | | 129.78 | na | | | |
| TOD | -2.0 | | 142.37 | na | | | |
| BOD | -8.0 | | 151.48 | na | | | |
| HD1 | -8.0 | | 151.71 | na | | | |
| PO | 0.0 | | 148.49 | na | | | |
| PI | -8.0 | | 65.34 | na | | | |
| JN1 | -2.0 | | 62.97 | na | | | |
| JN2 | -2.0 | | 63.16 | na | | | |
| FSA | -2.0 | | 66.52 | na | | | |
| FSAS | -2.0 | | 66.86 | na | | | |
| FSAT | -2.0 | | 67.12 | na | | | |
| HOSE | -2.0 | | 67.12 | na | 250.0 | | |
| TEST | 3.0 | | 65.33 | na | | | |

The maximum velocity is 23.28 and it occurs in the pipe between nodes 187 and AC

# Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
667 Congress Street 1st floor dry #1B



Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

| Hyd. Ref. Point | Qa Qt | Dia. "C" Pf/Ft | Fitting or Eqv. | Ln. | Pipe Ftng's Total | Pt Pe Pf | Pt Pv Pn | ******* Note |
|---|---|---|---|---|---|---|---|---|
| DP1 | 19.50 | 1.049 | 2T | 15.111 | 1.800 | 12.125 | | K Factor = 5.60 |
| to | | 150.0 | | 0.0 | 15.111 | -0.433 | | |
| EQ01 | 19.5 | 0.0822 | | 0.0 | 16.911 | 1.390 | | Vel = 7.24 |
| | 0.0 | | | | | | | |
| | 19.50 | | | | | 13.082 | | K Factor = 5.39 |
| 150 | 19.50 | 1.049 | | 0.0 | 12.000 | 13.082 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 151 | 19.5 | 0.1740 | | 0.0 | 12.000 | 2.088 | | Vel = 7.24 |
| 151 | 21.00 | 1.38 | 1T | 4.282 | 4.500 | 15.170 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 4.282 | 0.0 | | |
| 152 | 40.5 | 0.1768 | | 0.0 | 8.782 | 1.553 | | Vel = 8.69 |
| 152 | 0.0 | 2.635 | | 0.0 | 10.000 | 16.723 | | |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 157 | 40.5 | 0.0076 | | 0.0 | 10.000 | 0.076 | | Vel = 2.38 |
| | 0.0 | | | | | | | |
| | 40.50 | | | | | 16.799 | | K Factor = 9.88 |
| 155 | 19.55 | 1.049 | | 0.0 | 12.000 | 13.142 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 156 | 19.55 | 0.1748 | | 0.0 | 12.000 | 2.097 | | Vel = 7.26 |
| 156 | 21.04 | 1.38 | 1T | 4.282 | 4.500 | 15.239 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 4.282 | 0.0 | | |
| 157 | 40.59 | 0.1776 | | 0.0 | 8.782 | 1.560 | | Vel = 8.71 |
| 157 | 40.50 | 2.635 | 1X | 10.582 | 6.000 | 16.799 | | |
| to | | 100.0 | | 0.0 | 10.582 | 0.0 | | |
| AA | 81.09 | 0.0274 | | 0.0 | 16.582 | 0.454 | | Vel = 4.77 |
| | 0.0 | | | | | | | |
| | 81.09 | | | | | 17.253 | | K Factor = 19.52 |
| 160 | 19.54 | 1.049 | | 0.0 | 12.000 | 13.136 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 161 | 19.54 | 0.1747 | | 0.0 | 12.000 | 2.096 | | Vel = 7.25 |
| 161 | 21.04 | 1.38 | 1T | 4.282 | 4.500 | 15.232 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 4.282 | 0.0 | | |
| 162 | 40.58 | 0.1776 | | 0.0 | 8.782 | 1.560 | | Vel = 8.70 |
| 162 | 0.0 | 2.635 | | 0.0 | 8.000 | 16.792 | | |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 167 | 40.58 | 0.0075 | | 0.0 | 8.000 | 0.060 | | Vel = 2.39 |
| | 0.0 | | | | | | | |
| | 40.58 | | | | | 16.852 | | K Factor = 9.89 |
| 165 | 19.58 | 1.049 | | 0.0 | 12.000 | 13.185 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 166 | 19.58 | 0.1753 | | 0.0 | 12.000 | 2.103 | | Vel = 7.27 |
| 166 | 21.08 | 1.38 | 1T | 4.282 | 4.500 | 15.288 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 4.282 | 0.0 | | |
| 167 | 40.66 | 0.1781 | | 0.0 | 8.782 | 1.564 | | Vel = 8.72 |
| 167 | 40.58 | 2.635 | 1X | 10.582 | 4.000 | 16.852 | | |
| to | | 100.0 | | 0.0 | 10.582 | 0.0 | | |
| AA | 81.24 | 0.0275 | | 0.0 | 14.582 | 0.401 | | Vel = 4.78 |
| | 0.0 | | | | | | | |

# Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
667 Congress Street 1st floor dry #1B



Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

| Hyd. Ref. Point | Qa Qt | Dia. "C" Pf/Ft | Fitting or Eqv. | Ln. | Pipe Ftng's Total | Pt Pe Pf | Pt Pv Pn | ******* Note |
|---|---|---|---|---|---|---|---|---|
| | 81.24 | | | | | 17.253 | | K Factor = 19.56 |
| AA | 162.33 | 2.635 | 1V | 4.213 | 35.500 | 17.253 | | |
| to | | 100.0 | 1X | 10.582 | 14.795 | 0.0 | | |
| AB | 162.33 | 0.0989 | | 0.0 | 50.295 | 4.974 | | Vel = 9.55 |
| | 0.0 | | | | | | | |
| | 162.33 | | | | | 22.227 | | K Factor = 34.43 |
| 170 | 22.17 | 1.61 | | 0.0 | 12.000 | 16.904 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 171 | 22.17 | 0.0273 | | 0.0 | 12.000 | 0.328 | | Vel = 3.49 |
| 171 | 22.38 | 1.61 | | 0.0 | 12.000 | 17.232 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 172 | 44.55 | 0.0997 | | 0.0 | 12.000 | 1.196 | | Vel = 7.02 |
| 172 | 23.14 | 1.61 | 1V | 2.498 | 4.000 | 18.428 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 2.498 | 0.0 | | |
| 173 | 67.69 | 0.2159 | | 0.0 | 6.498 | 1.403 | | Vel = 10.67 |
| 173 | 0.0 | 1.61 | 1T | 5.71 | 0.500 | 19.831 | | |
| to | | 100.0 | | 0.0 | 5.710 | 0.433 | | |
| 174 | 67.69 | 0.2159 | | 0.0 | 6.210 | 1.341 | | Vel = 10.67 |
| | 0.0 | | | | | | | |
| | 67.69 | | | | | 21.605 | | K Factor = 14.56 |
| 175 | 22.27 | 1.61 | | 0.0 | 12.000 | 17.063 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 176 | 22.27 | 0.0276 | | 0.0 | 12.000 | 0.331 | | Vel = 3.51 |
| 176 | 22.49 | 1.61 | | 0.0 | 12.000 | 17.394 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 177 | 44.76 | 0.1005 | | 0.0 | 12.000 | 1.206 | | Vel = 7.05 |
| 177 | 23.25 | 1.61 | 1V | 2.498 | 4.000 | 18.600 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 2.498 | 0.0 | | |
| 178 | 68.01 | 0.2178 | | 0.0 | 6.498 | 1.415 | | Vel = 10.72 |
| 178 | 0.0 | 1.61 | 1T | 5.71 | 0.500 | 20.015 | | |
| to | | 100.0 | | 0.0 | 5.710 | 0.433 | | |
| 179 | 68.01 | 0.2179 | | 0.0 | 6.210 | 1.353 | | Vel = 10.72 |
| | 0.0 | | | | | | | |
| | 68.01 | | | | | 21.801 | | K Factor = 14.57 |
| 180 | 23.12 | 1.61 | | 0.0 | 12.000 | 18.396 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 181 | 23.12 | 0.0297 | | 0.0 | 12.000 | 0.356 | | Vel = 3.64 |
| 181 | 23.35 | 1.61 | | 0.0 | 12.000 | 18.752 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 182 | 46.47 | 0.1077 | | 0.0 | 12.000 | 1.292 | | Vel = 7.32 |
| 182 | 24.14 | 1.61 | 1V | 2.498 | 4.000 | 20.044 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 2.498 | 0.0 | | |
| 183 | 70.61 | 0.2335 | | 0.0 | 6.498 | 1.517 | | Vel = 11.13 |
| 183 | 0.0 | 1.61 | 1T | 5.71 | 0.500 | 21.561 | | |
| to | | 100.0 | | 0.0 | 5.710 | 0.433 | | |
| 184 | 70.61 | 0.2335 | | 0.0 | 6.210 | 1.450 | | Vel = 11.13 |
| | 0.0 | | | | | | | |
| | 70.61 | | | | | 23.444 | | K Factor = 14.58 |

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

| Hyd. Ref. Point | Qa Qt | Dia. "C" Pf/Ft | Fitting or Eqv. | Ln. | Pipe Ftng's Total | Pt Pe Pf | Pt Pv Pn | ******* Note |
|---|---|---|---|---|---|---|---|---|
| 185 | 27.05 | 1.61 | 1V | 2.498 | 28.000 | 25.166 | | K Factor @ node EQ01 |
| to | | 100.0 | | 0.0 | 2.498 | 0.0 | | |
| 186 | 27.05 | 0.0396 | | 0.0 | 30.498 | 1.207 | | Vel = 4.26 |
| 186 | 0.0 | 1.61 | 1T | 5.71 | 0.500 | 26.373 | | |
| to | | 100.0 | | 0.0 | 5.710 | 0.433 | | |
| 187 | 27.05 | 0.0396 | | 0.0 | 6.210 | 0.246 | | Vel = 4.26 |
| | 0.0 | | | | | | | |
| | 27.05 | | | | | 27.052 | | K Factor = 5.20 |
| 174 | 67.69 | 2.635 | | 0.0 | 10.000 | 21.605 | | |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 179 | 67.69 | 0.0196 | | 0.0 | 10.000 | 0.196 | | Vel = 3.98 |
| 179 | 68.01 | 2.635 | | 0.0 | 6.000 | 21.801 | | |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| AB | 135.7 | 0.0710 | | 0.0 | 6.000 | 0.426 | | Vel = 7.98 |
| AB | 162.33 | 2.635 | | 0.0 | 4.000 | 22.227 | | |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 184 | 298.03 | 0.3042 | | 0.0 | 4.000 | 1.217 | | Vel = 17.53 |
| 184 | 70.60 | 2.635 | | 0.0 | 8.000 | 23.444 | | |
| to | | 100.0 | | 0.0 | 0.0 | 0.0 | | |
| 187 | 368.63 | 0.4510 | | 0.0 | 8.000 | 3.608 | | Vel = 21.69 |
| 187 | 27.05 | 2.635 | 1V | 4.213 | 131.500 | 27.052 | | |
| to | | 100.0 | | 0.0 | 4.213 | 0.0 | | |
| AC | 395.68 | 0.5141 | | 0.0 | 135.713 | 69.766 | | Vel = 23.28 |
| AC | 0.0 | 3.26 | 5V | 23.979 | 74.000 | 96.818 | | |
| to | | 100.0 | | 0.0 | 23.979 | 0.0 | | |
| AD | 395.68 | 0.1823 | | 0.0 | 97.979 | 17.865 | | Vel = 15.21 |
| AD | 0.0 | 3.26 | 1V | 4.796 | 11.500 | 114.683 | | |
| to | | 100.0 | | 0.0 | 4.795 | 4.981 | | |
| AE | 395.68 | 0.1823 | | 0.0 | 16.295 | 2.970 | | Vel = 15.21 |
| AE | 0.0 | 3.26 | 1V | 4.796 | 20.000 | 122.634 | | |
| to | | 100.0 | | 0.0 | 4.795 | 0.0 | | |
| AF | 395.68 | 0.1823 | | 0.0 | 24.795 | 4.521 | | Vel = 15.21 |
| AF | 0.0 | 3.26 | 1X | 12.469 | 0.750 | 127.155 | | |
| to | | 100.0 | | 0.0 | 12.469 | 0.217 | | |
| AG | 395.68 | 0.1823 | | 0.0 | 13.219 | 2.410 | | Vel = 15.21 |
| AG | 0.0 | 3.26 | 2V | 9.592 | 47.000 | 129.782 | | |
| to | | 100.0 | 1X | 12.469 | 22.061 | 0.0 | | |
| TOD | 395.68 | 0.1823 | | 0.0 | 69.061 | 12.592 | | Vel = 15.21 |
| TOD | 0.0 | 3.26 | 1Dvc | 16.306 | 5.000 | 142.374 | | |
| to | | 100.0 | 1T | 14.388 | 30.693 | 2.599 | | |
| BOD | 395.68 | 0.1823 | | 0.0 | 35.693 | 6.507 | | Vel = 15.21 |
| BOD | 0.0 | 6.357 | 1G | 3.772 | 4.000 | 151.480 | | |
| to | | 120.0 | 1T | 37.72 | 41.492 | 0.0 | | |
| HD1 | 395.68 | 0.0050 | | 0.0 | 45.492 | 0.229 | | Vel = 4.00 |
| HD1 | 0.0 | 6.357 | 1G | 3.772 | 5.000 | 151.709 | | |
| to | | 120.0 | 1S | 40.235 | 44.007 | -3.465 | | |
| PO | 395.68 | 0.0050 | | 0.0 | 49.007 | 0.247 | | Vel = 4.00 |
| | 0.0 | | | | | | | |

# Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
667 Congress Street 1st floor dry #1B



Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 12/07/16

| Hyd. Ref. Point | Qa Qt | Dia. "C" Pf/Ft | Fitting or Eqv. | Ln. | Pipe Ftng's Total | Pt Pe Pf | Pv Pn | ******* | Note |
|---|---|---|---|---|---|---|---|---|---|
| | 395.68 | | | | | 148.491 | | K Factor = 32.47 | |
| System Demand Pressure | | | | | | 148.491 | | | |
| Safety Margin | | | | | | 22.972 | | | |
| Continuation Pressure | | | | | | 171.464 | | | |
| Pressure @ Pump Outlet | | | | | | 171.464 | | | |
| Pressure From Pump Curve | | | | | | -106.125 | | | |
| Pressure @ Pump Inlet | | | | | | 65.338 | | | |
| PI | 0.0 | 6.357 | 2E | 35.205 | 6.000 | 65.338 | | | |
| to | | 120.0 | 1G | 3.772 | 38.977 | -2.599 | | | |
| JN1 | 395.68 | 0.0050 | | 0.0 | 44.977 | 0.227 | | Vel = 4.00 | |
| JN1 | 0.0 | 6.357 | 1T | 37.72 | 1.000 | 62.966 | | | |
| to | | 120.0 | | 0.0 | 37.720 | 0.0 | | | |
| JN2 | 395.68 | 0.0051 | | 0.0 | 38.720 | 0.196 | | Vel = 4.00 | |
| JN2 | 0.0 | 6.357 | 1Zib | 0.0 | 6.000 | 63.162 | | | |
| to | | 120.0 | 3E | 52.808 | 52.808 | 3.067 | | * Fixed loss = 3.067 | |
| FSA | 395.68 | 0.0050 | | 0.0 | 58.808 | 0.295 | | Vel = 4.00 | |
| FSA | 0.0 | 8.27 | 1G | 6.326 | 197.000 | 66.524 | | | |
| to | | 140.0 | 1T | 55.354 | 118.616 | 0.0 | | | |
| FSAS | 395.68 | 0.0011 | 2E | 56.936 | 315.616 | 0.332 | | Vel = 2.36 | |
| FSAS | 0.0 | 8.27 | 1G | 6.326 | 186.000 | 66.856 | | | |
| to | | 140.0 | 1T | 55.354 | 61.680 | 0.0 | | | |
| FSAT | 395.68 | 0.0010 | | 0.0 | 247.680 | 0.260 | | Vel = 2.36 | |
| FSAT | 0.0 | 16.32 | 1T | 87.173 | 12.000 | 67.116 | | | |
| to | | 100.0 | | 0.0 | 87.174 | 0.0 | | | |
| HOSE | 395.68 | 0.0001 | | 0.0 | 99.174 | 0.008 | | Vel = 0.61 | |
| HOSE | 250.00 | 6.14 | 1G | 2.273 | 5.000 | 67.124 | | Qa = 250 | |
| to | | 100.0 | 1E | 10.608 | 12.881 | -2.166 | | | |
| TEST | 645.68 | 0.0207 | | 0.0 | 17.881 | 0.370 | | Vel = 7.00 | |
| | 0.0 | | | | | | | | |
| | 645.68 | | | | | 65.328 | | K Factor = 79.89 | |