

**... Fire Protection by Computer Design**

High Tech Fire Protection  
84 Hackett Mills Rd  
PO Box 156  
Poland, ME, 04274  
207-998-2551

Job Name : Alta Vista  
Building : 1  
Location : 495 Forest Avenue  
System : 1  
Contract :  
Data File : Alta Vista Calcs.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Alta Vista  
**Location:** 495 Forest Avenue  
**Drawing no:** 1  
**Date:** 8-22-2017

**Design**

**Remote area number:** 1  
**Remote area location:** Store Room Area  
**Occupancy classification:** Ordinary Group 2  
**Density:** .20 - Gpm/SqFt  
**Area of application:** 1500 - SqFt  
**Coverage per sprinkler:** 120 - SqFt  
**Type of sprinklers calculated:** Commercial Uprights  
**No. of sprinklers calculated:** 14  
**In-rack demand:** - GPM  
**Hose streams:** 250 - GPM  
**Total water required (including hose streams):** 603.186 - GPM @ 64.2634 - Psi  
**Type of system:** NFPA 13 Wet  
**Volume of dry or preaction system:** - Gal

**Water supply information**

**Date:** 06-27-2017  
**Location:** Main Drain of Unit  
**Source:** High Tech Fire Protection Main Drain Test

**Name of contractor:** High Tech Fire Protection  
**Address:** 84 Hackett Mills Rd / PO Box 156 / Poland, ME, 04274  
**Phone number:** 207-998-2551  
**Name of designer:** Ed Pennell  
**Authority having jurisdiction:** Portland Fire Department  
**Notes: (Include peaking information or gridded systems here.)**

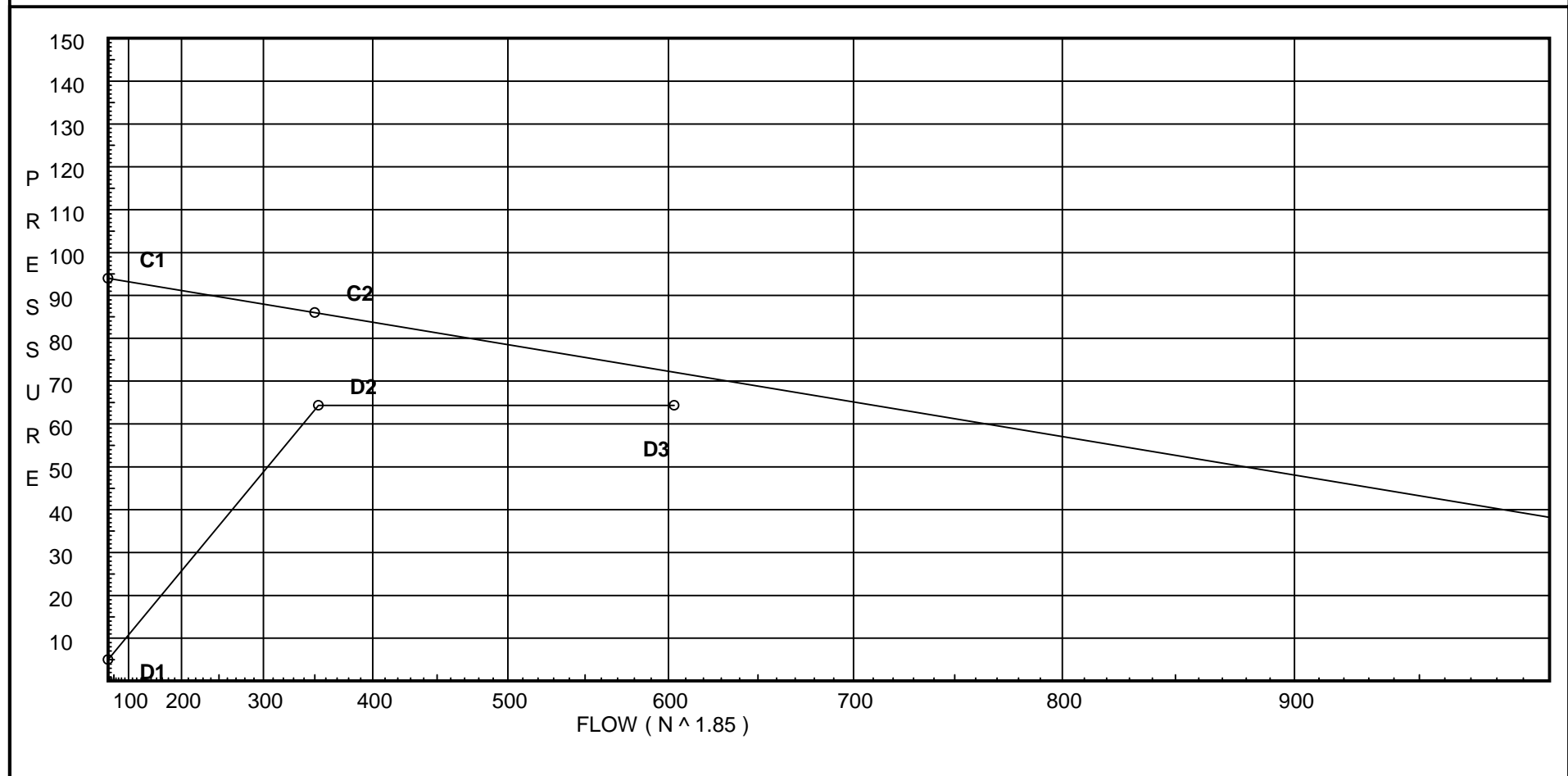
# Water Supply Curve (C)

High Tech Fire Protection  
Alta Vista

Page 2  
Date 8-22-2017

City Water Supply:  
C1 - Static Pressure : 94  
C2 - Residual Pressure: 86  
C2 - Residual Flow : 350

Demand:  
D1 - Elevation : 4.981  
D2 - System Flow : 353.385  
D2 - System Pressure : 64.356  
Hose ( Demand ) : 250  
D3 - System Demand : 603.385  
Safety Margin : 7.733



# Fittings Used Summary

High Tech Fire Protection  
Alta Vista

Page 3  
Date 8-22-2017

## Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
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	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0

## 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  
Alta Vista

Page 4  
Date 8-22-2017

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
L1	17.5	5.6	18.37	na	24.0	0.2	120	7.0
L2	17.0	5.6	18.77	na	24.26	0.2	120	7.0
L3	16.5	5.6	19.65	na	24.82	0.2	120	7.0
L4	16.3	5.6	21.17	na	25.77	0.2	120	7.0
L5	16.0		24.36	na				
L6	17.5	5.6	18.46	na	24.06	0.2	120	7.0
L7	17.0	5.6	18.86	na	24.32	0.2	120	7.0
L8	16.5	5.6	19.75	na	24.89	0.2	120	7.0
L9	16.3	5.6	21.28	na	25.83	0.2	120	7.0
L10	16.0		24.48	na				
L11	17.5	5.6	18.8	na	24.28	0.2	120	7.0
L12	17.0	5.6	19.21	na	24.54	0.2	120	7.0
L13	16.5	5.6	20.11	na	25.11	0.2	120	7.0
L14	16.3	5.6	21.66	na	26.06	0.2	120	7.0
L15	16.0		24.92	na				
L16	16.5	5.6	24.34	na	27.63	0.2	120	7.0
L17	16.3	5.6	24.66	na	27.81	0.2	120	7.0
L18	16.3		25.71	na				
L19	6.0		63.3	na				
TOR	6.0		64.36	na	250.0			

The maximum velocity is 14.44 and it occurs in the pipe between nodes L14 and L15

# Final Calculations - Hazen-Williams

High Tech Fire Protection  
Alta Vista

Page 5  
Date 8-22-2017

Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
L1	24.00	1.682		0.0	10.000	18.367				
to		120.0		0.0	0.0	0.217				K Factor = 5.60
L2	24.0	0.0183		0.0	10.000	0.183				Vel = 3.47
L2	24.26	1.682		0.0	10.000	18.767				K Factor = 5.60
to		120.0		0.0	0.0	0.217				
L3	48.26	0.0665		0.0	10.000	0.665				Vel = 6.97
L3	24.82	1.682		0.0	10.000	19.649				K Factor = 5.60
to		120.0		0.0	0.0	0.087				
L4	73.08	0.1435		0.0	10.000	1.435				Vel = 10.55
L4	25.77	1.682	1T	9.9	2.300	21.171				K Factor = 5.60
to		120.0		0.0	9.900	0.130				
L5	98.85	0.2510		0.0	12.200	3.062				Vel = 14.27
L5	0.0	3.26		0.0	12.000	24.363				
to		120.0		0.0	0.0	0.0				
L10	98.85	0.0100		0.0	12.000	0.120				Vel = 3.80
	0.0									
	98.85					24.483				K Factor = 19.98
L6	24.06	1.682		0.0	10.000	18.462				K Factor = 5.60
to		120.0		0.0	0.0	0.217				
L7	24.06	0.0183		0.0	10.000	0.183				Vel = 3.47
L7	24.32	1.682		0.0	10.000	18.862				K Factor = 5.60
to		120.0		0.0	0.0	0.217				
L8	48.38	0.0669		0.0	10.000	0.669				Vel = 6.99
L8	24.89	1.682		0.0	10.000	19.748				K Factor = 5.60
to		120.0		0.0	0.0	0.087				
L9	73.27	0.1442		0.0	10.000	1.442				Vel = 10.58
L9	25.83	1.682	1T	9.9	2.300	21.277				K Factor = 5.60
to		120.0		0.0	9.900	0.130				
L10	99.1	0.2521		0.0	12.200	3.076				Vel = 14.31
L10	98.85	3.26		0.0	12.000	24.483				
to		120.0		0.0	0.0	0.0				
L15	197.95	0.0361		0.0	12.000	0.433				Vel = 7.61
	0.0									
	197.95					24.916				K Factor = 39.66
L11	24.28	1.682		0.0	10.000	18.805				K Factor = 5.60
to		120.0		0.0	0.0	0.217				
L12	24.28	0.0186		0.0	10.000	0.186				Vel = 3.51
L12	24.55	1.682		0.0	10.000	19.208				K Factor = 5.60
to		120.0		0.0	0.0	0.217				
L13	48.83	0.0681		0.0	10.000	0.681				Vel = 7.05
L13	25.11	1.682		0.0	10.000	20.106				K Factor = 5.60
to		120.0		0.0	0.0	0.087				
L14	73.94	0.1466		0.0	10.000	1.466				Vel = 10.68
L14	26.06	1.682	1T	9.9	2.300	21.659				K Factor = 5.60
to		120.0		0.0	9.900	0.130				
L15	100.0	0.2563		0.0	12.200	3.127				Vel = 14.44
L15	197.95	3.26		0.0	12.000	24.916				
to		120.0		0.0	0.0	-0.130				
L18	297.95	0.0770		0.0	12.000	0.924				Vel = 11.45

# Final Calculations - Hazen-Williams

High Tech Fire Protection  
Alta Vista

Page 6  
Date 8-22-2017

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 297.95					25.710		K Factor = 58.76	
L16 to L17	27.63	1.682 120.0		10.000	24.336	0.087		K Factor = 5.60	
L17 to L18	27.63	0.0237		10.000	0.237			Vel = 3.99	
L17 to L18	27.81	1.682 120.0	1T	9.9 0.0	2.300 9.900	24.660 0.0		K Factor = 5.60	
L18 to L19	55.44	0.0861		12.200	1.050			Vel = 8.00	
L18 to L19	297.94	3.26 120.0	4V 1X	26.879 17.471	269.500 44.350	25.710 4.461			
L19 to TOR	353.38	0.1056		0.0	313.850	33.134		Vel = 13.58	
L19 to TOR	0.0	4.26 120.0	1T	26.334 0.0	10.300 26.334	63.305 0.0			
	353.38	0.0287		0.0	36.634	1.051		Vel = 7.95	
	250.00 603.38					64.356		Qa = 250.00 K Factor = 75.21	