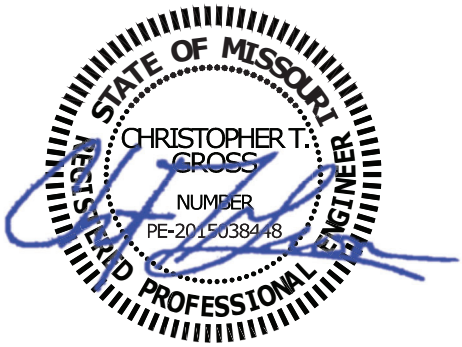
. . . Fire Protection by Computer Design

12-26-2023

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039



Job Name	:	Summit Square
Building	:	
Location	:	Stairwells
System	:	Standpipe
Contract	:	
Data File	:	Building 1 Wet Manual Standpipe.WXF

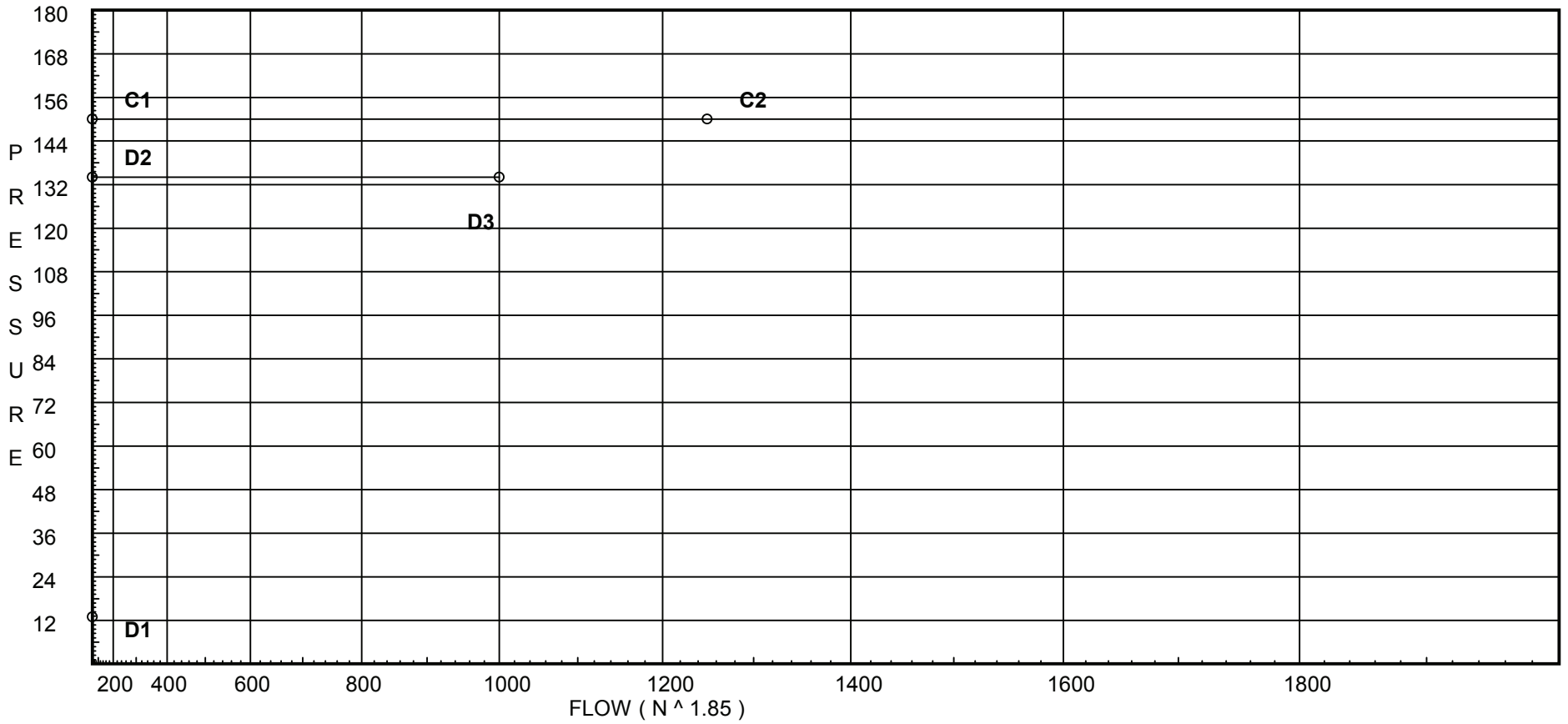
Water Supply Curve C

Ranger Fire Inc
Summit Square

Date

City Water Supply:
- C1 - Static Pressure : 150
- C2 - Residual Pressure: 150
- C2 - Residual Flow : 1250

Demand:
- D1 - Elevation : 12.957
- D2 - System Flow : _____
- D2 - System Pressure : 134.028
- Hose (Demand) : 1000
- D3 - System Demand : 1000
- Safety Margin : 15.972



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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

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.

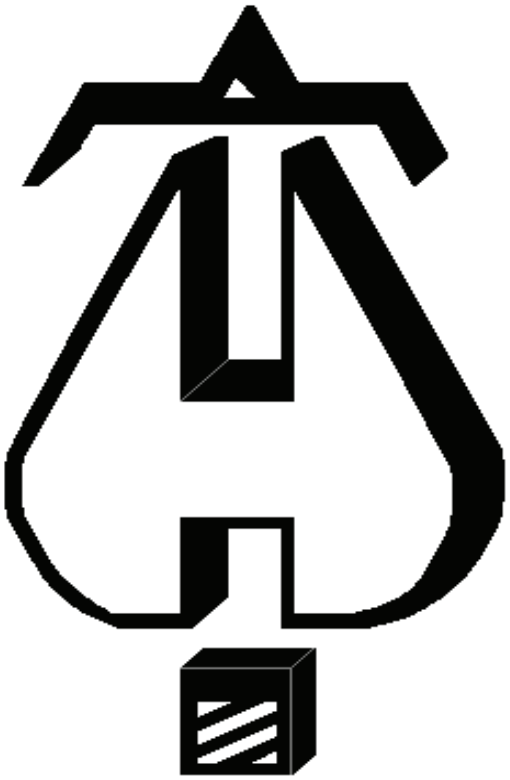
Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HV1	34.917		100.0	na	250.0			
V1	24.25		107.26	na				
HV3	47.0		91.49	na	250.0			
HV5	34.917		98.24	na	250.0			
V3	40.333		97.0	na				
X1	34.917		100.4	na				
V5	34.917		100.87	na				
HV4	34.917		103.46	na	250.0			
V4	34.917		106.1	na				
SP1	20.833		110.03	na				
SP1A	20.833		110.11	na				
SP2	20.833		110.35	na				
SP3	20.833		110.42	na				
SP3A	20.833		110.67	na				
SP4	20.833		110.76	na				
SP4X	20.833		113.48	na				
SP5	20.833		118.42	na				
SP6	20.833		121.48	na				
SP7	20.833		123.18	na				
SP8	10.25		128.55	na				
TOS	10.25		129.37	na				
BOS	5.0		132.85	na				
FDC	5.0		134.03	na				

The maximum velocity is 16.75 and it occurs in the pipe between nodes HV1 and V1

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
HV1	250.00	2.469	1T	8.564	0.167	100.000		Qa = 250
to		100.0		0.0	8.564	4.620		
V1	250.0	0.3018		0.0	8.731	2.635		Vel = 16.75
	0.0							
	250.00					107.255		K Factor = 24.14
V1	250.00	4.26	4E	52.668	17.001	107.255		
to		120.0	1B	15.8	68.468	1.480		
SP1	250.0	0.0151		0.0	85.469	1.292		Vel = 5.63
	0.0							
	250.00					110.027		K Factor = 23.83
HV3	250.00	2.469	1T	12.0	0.167	91.487		Qa = 250
to		120.0		0.0	12.000	2.887		
V3	250.0	0.2155		0.0	12.167	2.622		Vel = 16.75
	0.0							
	250.00					96.996		K Factor = 25.38
HV5	250.00	2.469	1T	8.564	0.167	98.238		Qa = 250
to		100.0		0.0	8.564	0.0		
V5	250.0	0.3018		0.0	8.731	2.635		Vel = 16.75
	0.0							
	250.00					100.873		K Factor = 24.89
V3	250.00	4.26	1E	9.397	40.333	96.996		
to		100.0		0.0	9.397	2.346		
X1	250.0	0.0212		0.0	49.730	1.053		Vel = 5.63
X1	0.0	4.26	1E	13.167	2.667	100.395		
to		120.0	1B	15.8	28.967	0.0		
V5	250.0	0.0151		0.0	31.634	0.478		Vel = 5.63
V5	250.00	4.26	1E	13.167	14.084	100.873		
to		120.0	1T	26.334	55.301	6.100		
SP4	500.0	0.0545	1B	15.8	69.385	3.783		Vel = 11.25
	0.0							
	500.00					110.756		K Factor = 47.51
HV4	250.00	2.469	1T	8.564	0.167	103.460		Qa = 250
to		100.0		0.0	8.564	0.0		
V4	250.0	0.3019		0.0	8.731	2.636		Vel = 16.75
V4	0.0	4.26	2T	52.668	16.500	106.096		
to		120.0	1B	15.8	68.468	6.100		
SP4X	250.0	0.0151		0.0	84.968	1.284		Vel = 5.63
	0.0							
	250.00					113.480		K Factor = 23.47
SP1	250.00	6.357	1T	37.72	1.917	110.027		
to		120.0		0.0	37.720	0.0		
SP1A	250.0	0.0022		0.0	39.637	0.086		Vel = 2.53
SP1A	0.0	6.357	1T	37.72	71.750	110.113		
to		120.0		0.0	37.720	0.0		
SP2	250.0	0.0021		0.0	109.470	0.235		Vel = 2.53
SP2	0.0	6.357	1E	17.603	16.917	110.348		
to		120.0		0.0	17.603	0.0		
SP3	250.0	0.0022		0.0	34.520	0.075		Vel = 2.53

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
SP3	0.0	6.357	1T	37.72	77.250	110.423				
to		120.0		0.0	37.720	0.0				
SP3A	250.0	0.0021		0.0	114.970	0.247		Vel = 2.53		
SP3A	0.0	6.357	1T	37.72	2.000	110.670				
to		120.0		0.0	37.720	0.0				
SP4	250.0	0.0022		0.0	39.720	0.086		Vel = 2.53		
SP4	500.00	6.357	1T	37.72	128.083	110.756				
to		120.0		0.0	37.720	0.0				
SP4X	750.0	0.0164		0.0	165.803	2.724		Vel = 7.58		
SP4X	250.00	6.357	2E	35.205	132.417	113.480				
to		120.0	1F	8.801	44.006	0.0				
SP5	1000.0	0.0280		0.0	176.423	4.936		Vel = 10.11		
SP5	0.0	6.357	1T	37.72	71.750	118.416				
to		120.0		0.0	37.720	0.0				
SP6	1000.0	0.0280		0.0	109.470	3.063		Vel = 10.11		
SP6	0.0	6.357	2E	35.205	25.417	121.479				
to		120.0		0.0	35.205	0.0				
SP7	1000.0	0.0280		0.0	60.622	1.696		Vel = 10.11		
SP7	0.0	6.357	1E	17.603	10.583	123.175				
to		120.0		0.0	17.603	4.584				
SP8	1000.0	0.0280		0.0	28.186	0.788		Vel = 10.11		
SP8	0.0	6.357	1E	17.603	11.833	128.547				
to		120.0		0.0	17.603	0.0				
TOS	1000.0	0.0280		0.0	29.436	0.824		Vel = 10.11		
TOS	0.0	6.357	1T	37.72	5.250	129.371				
to		120.0		0.0	37.720	2.274				
BOS	1000.0	0.0280		0.0	42.970	1.202		Vel = 10.11		
BOS	0.0	6.357	1S	40.235	2.000	132.847				
to		120.0		0.0	40.235	0.0				
FDC	1000.0	0.0280		0.0	42.235	1.181		Vel = 10.11		
	0.0									
	1000.00					134.028		K Factor = 86.38		



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name : Summit Square
Building :
Location : Stairwells
System : Standpipe
Contract :
Data File : Building 2 Wet Manual Standpipe.WXF

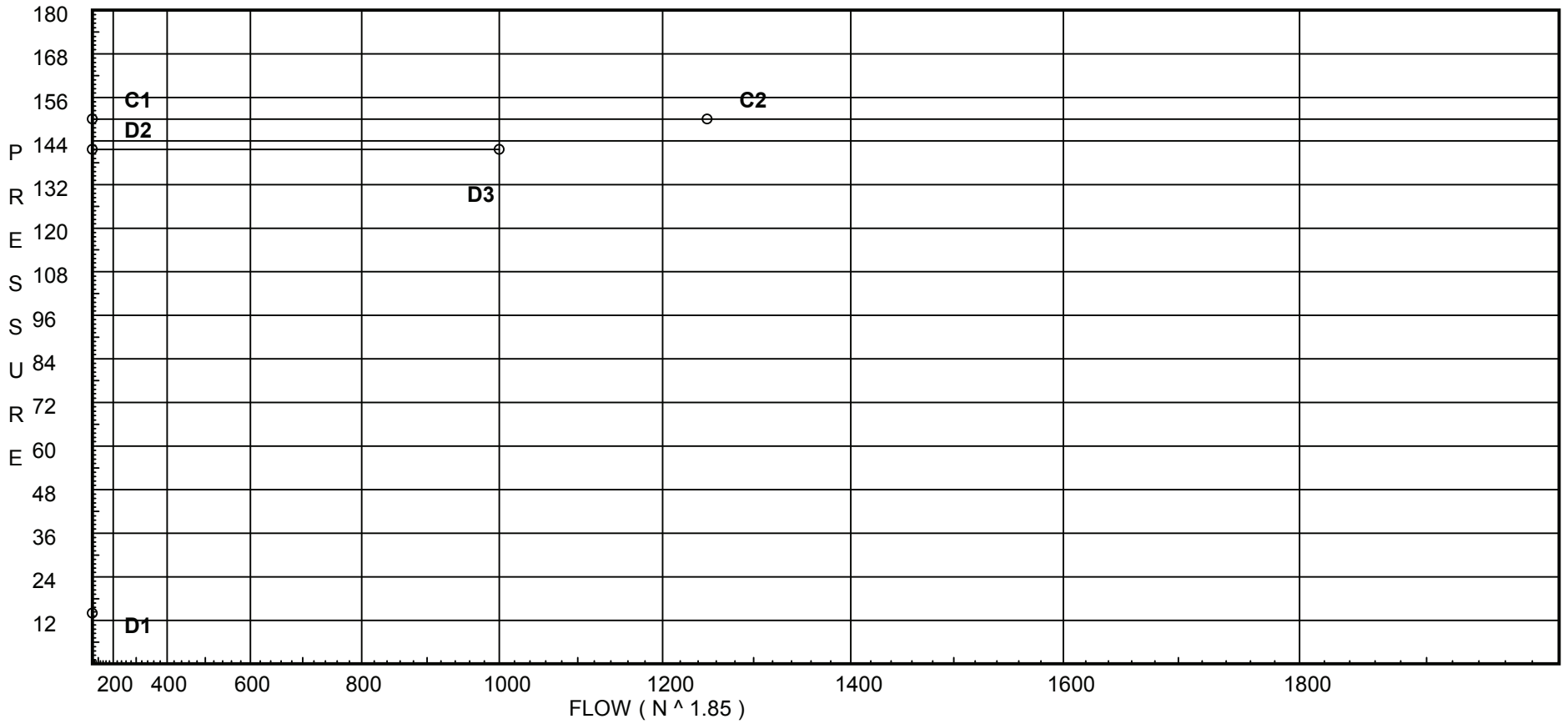
Water Supply Curve C

Ranger Fire Inc
Summit Square

Date

City Water Supply:
- C1 - Static Pressure : 150
- C2 - Residual Pressure: 150
- C2 - Residual Flow : 1250

Demand:
- D1 - Elevation : 14.040
- D2 - System Flow : _____
- D2 - System Pressure : 141.678
- Hose (Demand) : 1000
- D3 - System Demand : 1000
- Safety Margin : 8.322



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
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

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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HV5	34.917		100.0	na	250.0			
HV6	24.25		104.92	na	250.0			
V5	34.917		102.64	na				
V6	24.25		107.55	na				
HV7	34.917		107.89	na	250.0			
V7	34.917		110.52	na				
HV8	34.917		108.63	na	250.0			
V8	34.917		111.26	na				
SP10	20.833		115.66	na				
SP11	20.833		117.12	na				
SP12	20.833		117.9	na				
SPX	20.833		119.91	na				
SPX1	20.833		124.82	na				
SP13	20.833		127.21	na				
SP14	20.833		129.13	na				
SP15	10.25		134.5	na				
TOS	10.25		135.7	na				
BOS	1.0		141.02	na				
FDC	2.5		141.68	na				

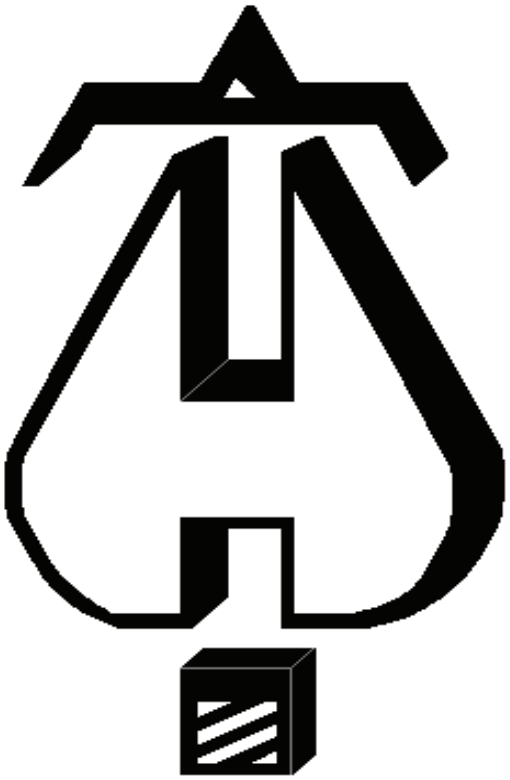
The maximum velocity is 16.75 and it occurs in the pipe between nodes HV5 and V5

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
HV5	250.00	2.469	1T	8.564	0.167	100.000		Qa = 250
to		100.0		0.0	8.564	0.0		
V5	250.0	0.3018		0.0	8.731	2.635		Vel = 16.75
	0.0							
	250.00					102.635		K Factor = 24.68
HV6	250.00	2.469	1T	8.564	0.167	104.918		Qa = 250
to		100.0		0.0	8.564	0.0		
V6	250.0	0.3018		0.0	8.731	2.635		Vel = 16.75
	0.0							
	250.00					107.553		K Factor = 24.11
V5	250.00	4.26		0.0	14.084	102.635		
to		100.0		0.0	0.0	4.620		
V6	250.0	0.0212		0.0	14.084	0.298		Vel = 5.63
V6	250.00	4.26	2E	18.795	37.833	107.553		
to		100.0	1T	18.795	48.866	1.480		
SP10	500.0	0.0764	1B	11.277	86.699	6.623		Vel = 11.25
	0.0							
	500.00					115.656		K Factor = 46.49
HV7	250.00	2.469	1T	8.564	0.167	107.887		Qa = 250
to		100.0		0.0	8.564	0.0		
V7	250.0	0.3018		0.0	8.731	2.635		Vel = 16.75
V7	0.0	4.26	2E	26.334	6.667	110.522		
to		120.0		0.0	26.334	6.100		
SP11	250.0	0.0151		0.0	33.001	0.499		Vel = 5.63
	0.0							
	250.00					117.121		K Factor = 23.10
HV8	250.00	2.469	1T	8.564	0.167	108.626		Qa = 250
to		100.0		0.0	8.564	0.0		
V8	250.0	0.3019		0.0	8.731	2.636		Vel = 16.75
V8	0.0	4.26	2E	18.795	6.750	111.262		
to		100.0		0.0	18.795	6.100		
SP12	250.0	0.0212		0.0	25.545	0.541		Vel = 5.63
	0.0							
	250.00					117.903		K Factor = 23.02
SP10	500.00	6.357	1T	37.72	151.083	115.656		
to		120.0		0.0	37.720	0.0		
SP11	500.0	0.0078		0.0	188.803	1.465		Vel = 5.05
SP11	250.00	6.357	1T	37.72	9.833	117.121		
to		120.0		0.0	37.720	0.0		
SP12	750.0	0.0164		0.0	47.553	0.782		Vel = 7.58
SP12	250.00	6.357	1T	37.72	34.000	117.903		
to		120.0		0.0	37.720	0.0		
SPX	1000.0	0.0280		0.0	71.720	2.006		Vel = 10.11
SPX	0.0	6.357	1E	17.603	120.333	119.909		
to		120.0	1T	37.72	55.323	0.0		
SPX1	1000.0	0.0280		0.0	175.656	4.915		Vel = 10.11
SPX1	0.0	6.357	1E	17.603	29.917	124.824		
to		120.0	1T	37.72	55.323	0.0		
SP13	1000.0	0.0280		0.0	85.240	2.384		Vel = 10.11

Final Calculations - Hazen-Williams

Ranger Fire Inc
Summit Square

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
SP13	0.0	6.357	2E	35.205	33.500	127.208		
to		120.0		0.0	35.205	0.0		
SP14	1000.0	0.0280		0.0	68.705	1.923		Vel = 10.11
SP14	0.0	6.357	1E	17.603	10.583	129.131		
to		120.0		0.0	17.603	4.584		
SP15	1000.0	0.0280		0.0	28.186	0.788		Vel = 10.11
SP15	0.0	6.357	2E	35.205	7.583	134.503		
to		120.0		0.0	35.205	0.0		
TOS	1000.0	0.0280		0.0	42.788	1.197		Vel = 10.11
TOS	0.0	6.357	1T	37.72	9.250	135.700		
to		120.0		0.0	37.720	4.006		
BOS	1000.0	0.0280		0.0	46.970	1.314		Vel = 10.11
BOS	0.0	6.357	1S	40.235	6.500	141.020		
to		120.0		0.0	40.235	-0.650		
FDC	1000.0	0.0280		0.0	46.735	1.308		Vel = 10.11
	0.0							
	1000.00					141.678		K Factor = 84.01



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name : Summit Square III
Building :
Location :
System :
Contract :
Data File : Building 1 Section A Wet System Remote 1.WXF

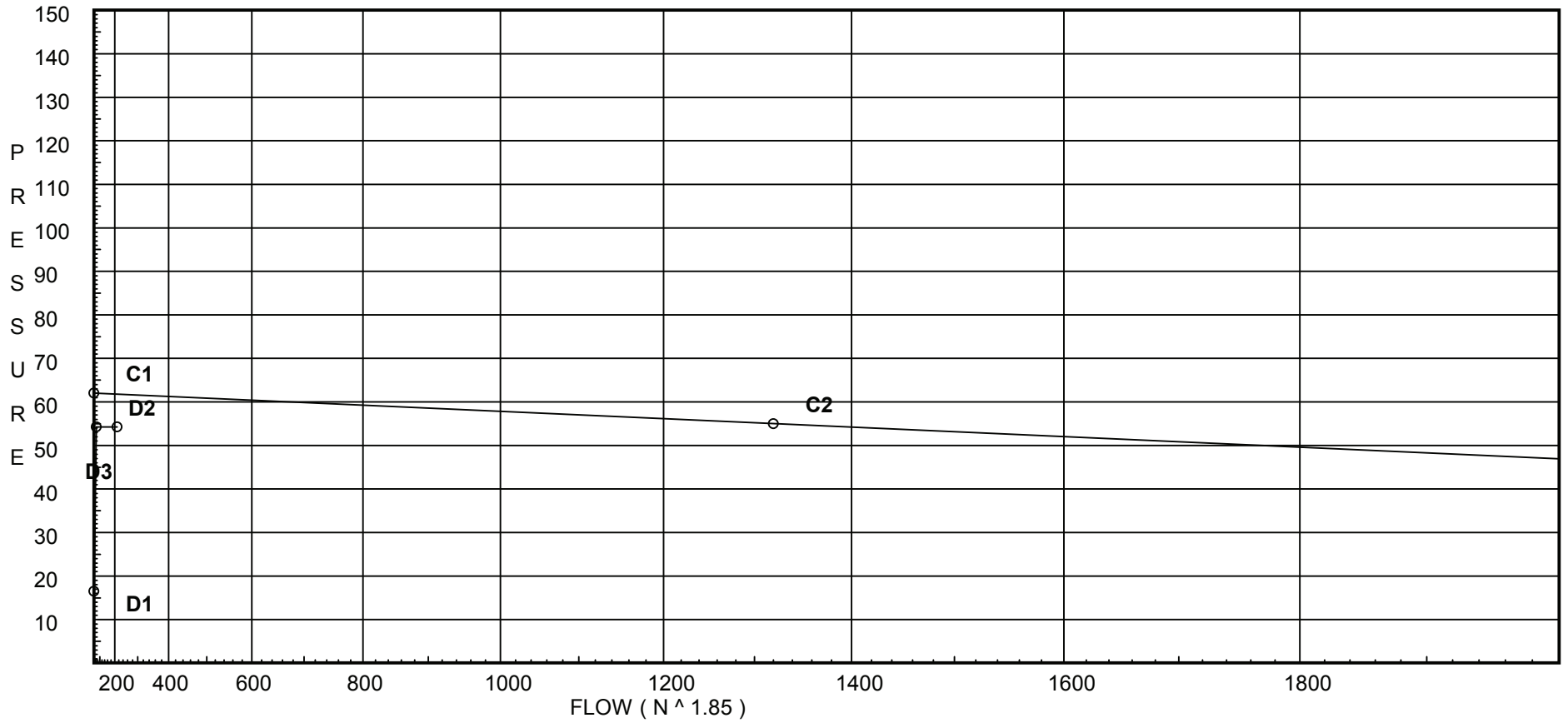
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 62
- C2 - Residual Pressure: 55
- C2 - Residual Flow : 1320

Demand:
- D1 - Elevation : 16.494
- D2 - System Flow : 62.64
- D2 - System Pressure : 54.286
- Hose (Demand) : 150
- D3 - System Demand : 212.64
- Safety Margin : 7.475



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	40.583	4.4	11.6	na	14.99	0.05	225	11.6
B1	20.167		23.32	na				
S2	40.583	4.4	13.3	na	16.05	0.05	160	13.3
B2	20.167		25.41	na				
S3	40.583	4.4	13.48	na	16.15	0.05	196	10.2
B3	20.167		25.63	na				
S4	40.583	4.4	12.33	na	15.45	0.05	196	10.2
B4	20.167		24.22	na				
S5	40.583		19.04	na				
B5	20.167		27.88	na				
S10	40.583		21.38	na				
B10	20.167		30.22	na				
S11	40.583		19.87	na				
B11	20.167		28.71	na				
S12	40.583		22.08	na				
B12	20.167		30.92	na				
S13	40.583		19.04	na				
B13	20.167		27.88	na				
200	20.167		37.63	na				
200A	20.167		36.01	na				
201	20.167		26.52	na				
202	20.167		26.51	na				
203	20.167		27.88	na				
204	20.167		28.71	na				
205	20.167		30.22	na				
206	20.167		30.92	na				
206A	20.167		36.55	na				
2ND	20.167		40.01	na				
SP1	20.833		41.29	na				
SP1A	20.833		41.29	na				
SP2	20.833		41.3	na				
SP3	20.833		41.31	na				
SP3A	20.833		41.33	na				
SP4	20.833		41.34	na				
SP4X	20.833		41.36	na				
SP5	20.833		41.39	na				
SP6	20.833		41.41	na				
SP7	20.833		41.42	na				
SP8	10.25		46.01	na				
TOS	10.25		46.01	na				
BOS	5.0		48.29	na				
FLG	1.0		57.09	na				
CH1	-5.0		59.69	na				
UG1	-5.0		59.7	na	150.0			
UG2	-5.0		52.47	na				
UG3	-5.0		50.16	na				
CT1	-5.0		57.95	na				
CT2	-5.0		57.41	na				
CT3	-5.0		56.91	na				
CTY	2.5		54.29	na				

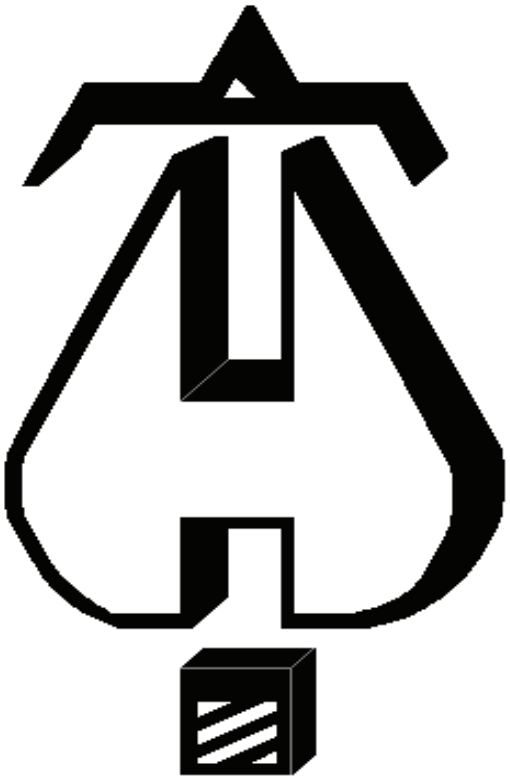
The maximum velocity is 13.61 and it occurs in the pipe between nodes CT3 and UG1

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S1	14.99	0.874	1O	3.0	20.416	11.602		K Factor = 4.40
to		150.0		0.0	3.000	8.842		
B1	14.99	0.1228		0.0	23.416	2.876		Vel = 8.02
B1	0.0	0.874	1N	7.0	16.000	23.320		
to		150.0	1O	3.0	10.000	0.0		
202	14.99	0.1228		0.0	26.000	3.194		Vel = 8.02
	0.0							
	14.99					26.514		K Factor = 2.91
S2	16.05	0.874	1O	3.0	20.416	13.300		K Factor = 4.40
to		150.0		0.0	3.000	8.842		
B2	16.05	0.1394		0.0	23.416	3.264		Vel = 8.58
B2	0.0	0.874	1O	3.0	5.000	25.406		
to		150.0		0.0	3.000	0.0		
201	16.05	0.1393		0.0	8.000	1.114		Vel = 8.58
	0.0							
	16.05					26.520		K Factor = 3.12
S3	16.15	0.874	1O	3.0	20.416	13.480		K Factor = 4.40
to		150.0		0.0	3.000	8.842		
B3	16.15	0.1411		0.0	23.416	3.305		Vel = 8.64
B3	0.0	0.874	1O	3.0	3.333	25.627		
to		150.0		0.0	3.000	0.0		
201	16.15	0.1410		0.0	6.333	0.893		Vel = 8.64
	0.0							
	16.15					26.520		K Factor = 3.14
S4	15.45	0.874	1O	3.0	20.416	12.332		K Factor = 4.40
to		150.0		0.0	3.000	8.842		
B4	15.45	0.1300		0.0	23.416	3.044		Vel = 8.26
B4	0.0	0.874	1N	7.0	7.667	24.218		
to		150.0	1O	3.0	10.000	0.0		
202	15.45	0.1300		0.0	17.667	2.296		Vel = 8.26
	0.0							
	15.45					26.514		K Factor = 3.00
S5	0.0	0.874	1O	3.0	20.416	19.038		
to		150.0		0.0	3.000	8.842		
B5	0.0	0.0		0.0	23.416	0.0		Vel = 0
B5	0.0	0.874	1N	7.0	9.750	27.880		
to		150.0	1O	3.0	10.000	0.0		
203	0.0	0.0		0.0	19.750	0.0		Vel = 0
	0.0							
	0.0					27.880		K Factor = 0
S10	0.0	0.874	1O	3.0	20.416	21.381		
to		150.0		0.0	3.000	8.842		
B10	0.0	0.0		0.0	23.416	0.0		Vel = 0
B10	0.0	0.874	2N	14.0	9.500	30.223		
to		150.0	1O	3.0	17.000	0.0		
205	0.0	0.0		0.0	26.500	0.0		Vel = 0
	0.0							
	0.0					30.223		K Factor = 0

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S11	0.0	0.874	1O	3.0	20.416	19.866		
to		150.0		0.0	3.000	8.842		
B11	0.0	0.0		0.0	23.416	0.0		Vel = 0
B11	0.0	0.874	1O	3.0	6.333	28.708		
to		150.0		0.0	3.000	0.0		
204	0.0	0.0		0.0	9.333	0.0		Vel = 0
	0.0							
	0.0					28.708		K Factor = 0
S12	0.0	0.874	1O	3.0	20.416	22.078		
to		150.0		0.0	3.000	8.842		
B12	0.0	0.0		0.0	23.416	0.001		Vel = 0
B12	0.0	0.874	2O	6.0	7.083	30.921		
to		150.0	1N	7.0	13.000	0.0		
206	0.0	0.0		0.0	20.083	0.0		Vel = 0
	0.0							
	0.0					30.921		K Factor = 0
S13	0.0	0.874	1O	3.0	20.416	19.038		
to		150.0		0.0	3.000	8.842		
B13	0.0	0.0		0.0	23.416	0.0		Vel = 0
B13	0.0	0.874	2N	14.0	7.167	27.880		
to		150.0	1O	3.0	17.000	0.0		
203	0.0	0.0		0.0	24.167	0.0		Vel = 0
	0.0							
	0.0					27.880		K Factor = 0
200	-39.44	1.598	1N	9.0	32.583	37.633		
to		150.0		0.0	9.000	0.0		
200A	-39.44	-0.0389		0.0	41.583	-1.619		Vel = 6.31
200A	0.0	1.394	1N	8.0	117.333	36.014		
to		150.0		0.0	8.000	0.0		
201	-39.44	-0.0758		0.0	125.333	-9.494		Vel = 8.29
201	32.20	1.394		0.0	2.083	26.520		
to		150.0		0.0	0.0	0.0		
202	-7.24	-0.0029		0.0	2.083	-0.006		Vel = 1.52
202	30.44	1.394	1N	8.0	40.167	26.514		
to		150.0		0.0	8.000	0.0		
203	23.2	0.0284		0.0	48.167	1.366		Vel = 4.88
203	0.0	1.394		0.0	29.167	27.880		
to		150.0		0.0	0.0	0.0		
204	23.2	0.0284		0.0	29.167	0.828		Vel = 4.88
204	0.0	1.394	2N	16.0	37.417	28.708		
to		150.0		0.0	16.000	0.0		
205	23.2	0.0284		0.0	53.417	1.515		Vel = 4.88
205	0.0	1.394		0.0	24.583	30.223		
to		150.0		0.0	0.0	0.0		
206	23.2	0.0284		0.0	24.583	0.698		Vel = 4.88
206	0.0	1.394	6N	48.0	150.583	30.921		
to		150.0		0.0	48.000	0.0		
206A	23.2	0.0284		0.0	198.583	5.634		Vel = 4.88

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
206A	0.0	1.598	2N	18.0	47.917	36.555		
to		150.0	1O	8.0	26.000	0.0		
200	23.2	0.0146		0.0	73.917	1.078		Vel = 3.71
	0.0							
	23.20					37.633		K Factor = 3.78
200	62.64	2.157	4E	24.613	33.000	37.633		
to		120.0	1Ball	2.769	40.919	0.0		
2ND	62.64	0.0321	1S	13.537	73.919	2.376		Vel = 5.50
2ND	0.0	2.003	1N	11.0	30.333	40.009		
to		150.0	1O	10.0	21.000	-0.288		
SP1A	62.64	0.0305		0.0	51.333	1.565		Vel = 6.38
	0.0							
	62.64					41.286		K Factor = 9.75
SP1	0.0	6.357	1T	37.72	1.917	41.286		
to		120.0		0.0	37.720	0.0		
SP1A	0.0	0.0		0.0	39.637	0.0		Vel = 0
SP1A	62.64	6.357	1T	37.72	71.750	41.286		
to		120.0		0.0	37.720	0.0		
SP2	62.64	0.0002		0.0	109.470	0.018		Vel = 0.63
SP2	0.0	6.357	1E	17.603	16.917	41.304		
to		120.0		0.0	17.603	0.0		
SP3	62.64	0.0002		0.0	34.520	0.006		Vel = 0.63
SP3	0.0	6.357	1T	37.72	77.250	41.310		
to		120.0		0.0	37.720	0.0		
SP3A	62.64	0.0002		0.0	114.970	0.019		Vel = 0.63
SP3A	0.0	6.357	1T	37.72	2.000	41.329		
to		120.0		0.0	37.720	0.0		
SP4	62.64	0.0002		0.0	39.720	0.007		Vel = 0.63
SP4	0.0	6.357	1T	37.72	128.083	41.336		
to		120.0		0.0	37.720	0.0		
SP4X	62.64	0.0002		0.0	165.803	0.027		Vel = 0.63
SP4X	0.0	6.357	2E	35.205	132.417	41.363		
to		120.0	1F	8.801	44.006	0.0		
SP5	62.64	0.0002		0.0	176.423	0.030		Vel = 0.63
SP5	0.0	6.357	1T	37.72	71.750	41.393		
to		120.0		0.0	37.720	0.0		
SP6	62.64	0.0002		0.0	109.470	0.018		Vel = 0.63
SP6	0.0	6.357	2E	35.205	25.417	41.411		
to		120.0		0.0	35.205	0.0		
SP7	62.64	0.0002		0.0	60.622	0.010		Vel = 0.63
SP7	0.0	6.357	1E	17.603	10.583	41.421		
to		120.0		0.0	17.603	4.584		
SP8	62.64	0.0001		0.0	28.186	0.004		Vel = 0.63
SP8	0.0	6.357	1E	17.603	11.833	46.009		
to		120.0		0.0	17.603	0.0		
TOS	62.64	0.0002		0.0	29.436	0.005		Vel = 0.63
TOS	0.0	6.357	1T	37.72	5.250	46.014		
to		120.0		0.0	37.720	2.274		
BOS	62.64	0.0002		0.0	42.970	0.007		Vel = 0.63

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
BOS	0.0	3.26	1Zcb	0.0	4.000	48.295		
to		140.0		0.0	0.0	8.782		* * Fixed Loss = 7.05
FLG	62.64	0.0032		0.0	4.000	0.013		Vel = 2.41
FLG	0.0	8.27	1E	28.468	11.000	57.090		
to		140.0		0.0	28.468	2.599		
CH1	62.64	0.0		0.0	39.468	0.001		Vel = 0.37
CH1	0.0	7.68	1T	43.857	56.500	59.690		
to		150.0	1B	15.037	58.894	0.0		
UG1	62.64	0.0		0.0	115.394	0.005		Vel = 0.43
	0.0							
	62.64					59.695		K Factor = 8.11
UG1	-931.28	7.68	4F	45.11	1029.417	59.695		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-931.28	-0.0065		0.0	1118.384	-7.228		Vel = 6.45
UG2	0.0	7.68	1T	43.857	312.417	52.467		
to		150.0		0.0	43.857	0.0		
UG3	-931.28	-0.0065		0.0	356.274	-2.303		Vel = 6.45
UG3	0.0	7.68	1T	43.857	33.117	50.164		
to		150.0	1Zcg	0.0	43.857	8.280		* * Fixed Loss = 8.28
CT1	-931.28	-0.0065		0.0	76.974	-0.498		Vel = 6.45
CT1	0.0	11.2	1T	66.446	456.417	57.946		
to		150.0		0.0	66.446	0.0		
CT2	-931.28	-0.0010		0.0	522.863	-0.538		Vel = 3.03
CT2	-212.64	11.2	1T	66.446	267.583	57.408		
to		150.0		0.0	66.446	0.0		
CT3	-1143.92	-0.0015		0.0	334.029	-0.503		Vel = 3.73
CT3	0.0	5.86	1T	38.342	192.333	56.905		
to		150.0	1F	8.947	47.288	11.248		* * Fixed Loss = 11.248
UG1	-1143.92	-0.0353	1Zcg	0.0	239.621	-8.458		Vel = 13.61
	0.0							
	-1143.92					59.695		K Factor = -148.06
CT2	212.64	6.16	1E	20.084	22.500	57.408		
to		140.0	1G	4.304	67.425	-3.248		
CTY	212.64	0.0014	1T	43.037	89.925	0.126		Vel = 2.29
	0.0							
	212.64					54.286		K Factor = 28.86



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section A Wet System Remote 2.WXF

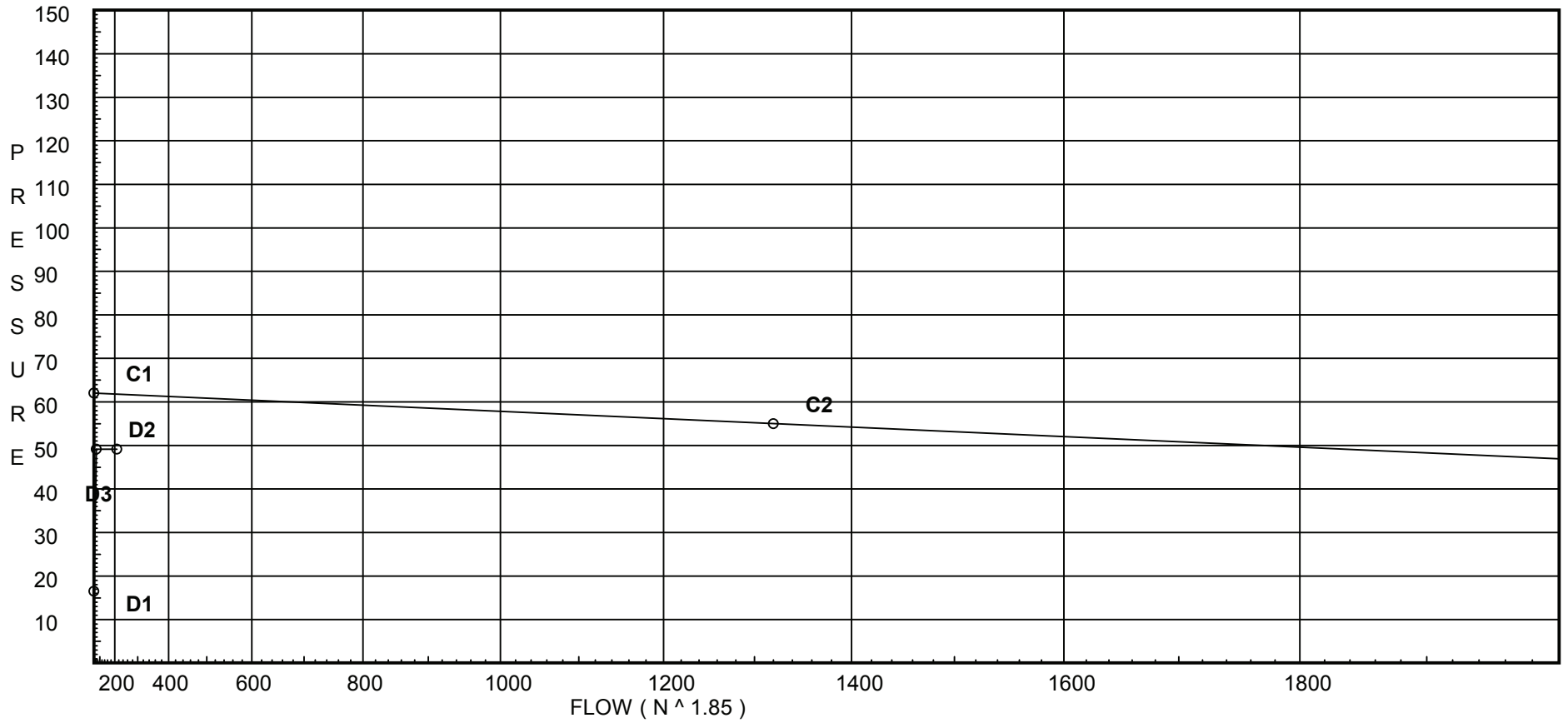
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 62
- C2 - Residual Pressure: 55
- C2 - Residual Flow : 1320

Demand:
- D1 - Elevation : 16.494
- D2 - System Flow : 61.73
- D2 - System Pressure : 49.121
- Hose (Demand) : 150
- D3 - System Demand : 211.73
- Safety Margin : 12.642



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	40.583		15.98	na				
B1	20.167		24.82	na				
S2	40.583		16.09	na				
B2	20.167		24.93	na				
S3	40.583		16.09	na				
B3	20.167		24.93	na				
S4	40.583		15.98	na				
B4	20.167		24.82	na				
S5	40.583		13.47	na				
B5	20.167		22.31	na				
S10	40.583	5.6	7.0	na	14.82	0.1	91	7.0
B10	20.167		18.66	na				
S11	40.583	5.6	8.36	na	16.19	0.1	98	7.0
B11	20.167		20.52	na				
S12	40.583	5.6	7.62	na	15.46	0.1	98	7.0
B12	20.167		19.51	na				
S13	40.583	5.6	7.43	na	15.26	0.1	105	7.0
B13	20.167		19.24	na				
200	20.167		32.58	na				
200A	20.167		31.47	na				
201	20.167		24.93	na				
202	20.167		24.82	na				
203	20.167		22.31	na				
204	20.167		21.85	na				
205	20.167		21.84	na				
206	20.167		22.12	na				
206A	20.167		30.9	na				
2ND	20.167		34.9	na				
SP1	20.833		36.13	na				
SP1A	20.833		36.13	na				
SP2	20.833		36.15	na				
SP3	20.833		36.16	na				
SP3A	20.833		36.17	na				
SP4	20.833		36.18	na				
SP4X	20.833		36.21	na				
SP5	20.833		36.24	na				
SP6	20.833		36.25	na				
SP7	20.833		36.26	na				
SP8	10.25		40.85	na				
TOS	10.25		40.86	na				
BOS	5.0		43.14	na				
FLG	1.0		51.93	na				
CH1	-5.0		54.53	na				
UG1	-5.0		54.54	na	150.0			
UG2	-5.0		47.31	na				
UG3	-5.0		45.0	na				
CT1	-5.0		52.78	na				
CT2	-5.0		52.24	na				
CT3	-5.0		51.74	na				
CTY	2.5		49.12	na				

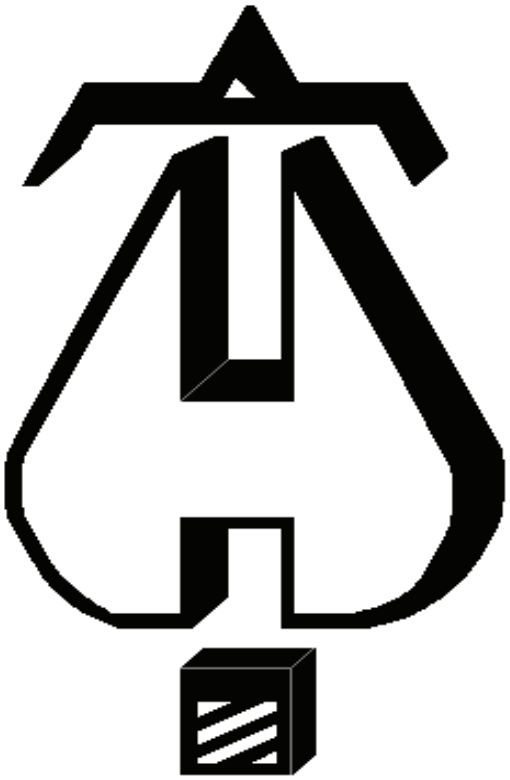
The maximum velocity is 13.6 and it occurs in the pipe between nodes CT3 and UG1

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S1	0.0	0.874	1O	3.0	20.416	15.982		
to		150.0		0.0	3.000	8.842		
B1	0.0	0.0		0.0	23.416	0.0		Vel = 0
B1	0.0	0.874	1N	7.0	16.000	24.824		
to		150.0	1O	3.0	10.000	0.0		
202	0.0	0.0		0.0	26.000	0.0		Vel = 0
	0.0							
	0.0					24.824		K Factor = 0
S2	0.0	0.874	1O	3.0	20.416	16.090		
to		150.0		0.0	3.000	8.842		
B2	0.0	0.0		0.0	23.416	0.001		Vel = 0
B2	0.0	0.874	1O	3.0	5.000	24.933		
to		150.0		0.0	3.000	0.0		
201	0.0	0.0		0.0	8.000	0.0		Vel = 0
	0.0							
	0.0					24.933		K Factor = 0
S3	0.0	0.874	1O	3.0	20.416	16.090		
to		150.0		0.0	3.000	8.842		
B3	0.0	0.0		0.0	23.416	0.001		Vel = 0
B3	0.0	0.874	1O	3.0	3.333	24.933		
to		150.0		0.0	3.000	0.0		
201	0.0	0.0		0.0	6.333	0.0		Vel = 0
	0.0							
	0.0					24.933		K Factor = 0
S4	0.0	0.874	1O	3.0	20.416	15.982		
to		150.0		0.0	3.000	8.842		
B4	0.0	0.0		0.0	23.416	0.0		Vel = 0
B4	0.0	0.874	1N	7.0	7.667	24.824		
to		150.0	1O	3.0	10.000	0.0		
202	0.0	0.0		0.0	17.667	0.0		Vel = 0
	0.0							
	0.0					24.824		K Factor = 0
S5	0.0	0.874	1O	3.0	20.416	13.470		
to		150.0		0.0	3.000	8.842		
B5	0.0	0.0		0.0	23.416	0.0		Vel = 0
B5	0.0	0.874	1N	7.0	9.750	22.312		
to		150.0	1O	3.0	10.000	0.0		
203	0.0	0.0		0.0	19.750	0.0		Vel = 0
	0.0							
	0.0					22.312		K Factor = 0
S10	14.82	0.874	1O	3.0	20.416	7.000		K Factor = 5.60
to		150.0		0.0	3.000	8.842		
B10	14.82	0.1203		0.0	23.416	2.816		Vel = 7.93
B10	0.0	0.874	2N	14.0	9.500	18.658		
to		150.0	1O	3.0	17.000	0.0		
205	14.82	0.1202		0.0	26.500	3.186		Vel = 7.93
	0.0							
	14.82					21.844		K Factor = 3.17

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S11	16.19	0.874	1O	3.0	20.416	8.363		K Factor = 5.60
to		150.0		0.0	3.000	8.842		
B11	16.19	0.1417		0.0	23.416	3.319		Vel = 8.66
B11	0.0	0.874	1O	3.0	6.333	20.524		
to		150.0		0.0	3.000	0.0		
204	16.19	0.1418		0.0	9.333	1.323		Vel = 8.66
	0.0							
	16.19					21.847		K Factor = 3.46
S12	15.46	0.874	1O	3.0	20.416	7.620		K Factor = 5.60
to		150.0		0.0	3.000	8.842		
B12	15.46	0.1301		0.0	23.416	3.046		Vel = 8.27
B12	0.0	0.874	2O	6.0	7.083	19.508		
to		150.0	1N	7.0	13.000	0.0		
206	15.46	0.1301		0.0	20.083	2.612		Vel = 8.27
	0.0							
	15.46					22.120		K Factor = 3.29
S13	15.26	0.874	1O	3.0	20.416	7.426		K Factor = 5.60
to		150.0		0.0	3.000	8.842		
B13	15.26	0.1270		0.0	23.416	2.974		Vel = 8.16
B13	0.0	0.874	2N	14.0	7.167	19.242		
to		150.0	1O	3.0	17.000	0.0		
203	15.26	0.1270		0.0	24.167	3.070		Vel = 8.16
	0.0							
	15.26					22.312		K Factor = 3.23
200	-32.24	1.598	1N	9.0	32.583	32.585		
to		150.0		0.0	9.000	0.0		
200A	-32.24	-0.0268		0.0	41.583	-1.116		Vel = 5.16
200A	0.0	1.394	1N	8.0	117.333	31.469		
to		150.0		0.0	8.000	0.0		
201	-32.24	-0.0521		0.0	125.333	-6.536		Vel = 6.78
201	0.0	1.394		0.0	2.083	24.933		
to		150.0		0.0	0.0	0.0		
202	-32.24	-0.0523		0.0	2.083	-0.109		Vel = 6.78
202	0.0	1.394	1N	8.0	40.167	24.824		
to		150.0		0.0	8.000	0.0		
203	-32.24	-0.0522		0.0	48.167	-2.512		Vel = 6.78
203	15.26	1.394		0.0	29.167	22.312		
to		150.0		0.0	0.0	0.0		
204	-16.98	-0.0159		0.0	29.167	-0.465		Vel = 3.57
204	16.20	1.394	2N	16.0	37.417	21.847		
to		150.0		0.0	16.000	0.0		
205	-0.78	-0.0001		0.0	53.417	-0.003		Vel = 0.16
205	14.81	1.394		0.0	24.583	21.844		
to		150.0		0.0	0.0	0.0		
206	14.03	0.0112		0.0	24.583	0.276		Vel = 2.95
206	15.46	1.394	6N	48.0	150.583	22.120		
to		150.0		0.0	48.000	0.0		
206A	29.49	0.0442		0.0	198.583	8.783		Vel = 6.20

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
206A	0.0	1.598	2N	18.0	47.917	30.903		
to		150.0	1O	8.0	26.000	0.0		
200	29.49	0.0228		0.0	73.917	1.682		Vel = 4.72
	0.0							
	29.49					32.585		K Factor = 5.17
200	61.73	2.157	4E	24.613	33.000	32.585		
to		120.0	1Ball	2.769	40.919	0.0		
2ND	61.73	0.0313	1S	13.537	73.919	2.311		Vel = 5.42
2ND	0.0	2.003	1N	11.0	30.333	34.896		
to		150.0	1O	10.0	21.000	-0.288		
SP1A	61.73	0.0297		0.0	51.333	1.524		Vel = 6.29
	0.0							
	61.73					36.132		K Factor = 10.27
SP1	0.0	6.357	1T	37.72	1.917	36.132		
to		120.0		0.0	37.720	0.0		
SP1A	0.0	0.0		0.0	39.637	0.0		Vel = 0
SP1A	61.73	6.357	1T	37.72	71.750	36.132		
to		120.0		0.0	37.720	0.0		
SP2	61.73	0.0002		0.0	109.470	0.018		Vel = 0.62
SP2	0.0	6.357	1E	17.603	16.917	36.150		
to		120.0		0.0	17.603	0.0		
SP3	61.73	0.0001		0.0	34.520	0.005		Vel = 0.62
SP3	0.0	6.357	1T	37.72	77.250	36.155		
to		120.0		0.0	37.720	0.0		
SP3A	61.73	0.0002		0.0	114.970	0.019		Vel = 0.62
SP3A	0.0	6.357	1T	37.72	2.000	36.174		
to		120.0		0.0	37.720	0.0		
SP4	61.73	0.0002		0.0	39.720	0.006		Vel = 0.62
SP4	0.0	6.357	1T	37.72	128.083	36.180		
to		120.0		0.0	37.720	0.0		
SP4X	61.73	0.0002		0.0	165.803	0.027		Vel = 0.62
SP4X	0.0	6.357	2E	35.205	132.417	36.207		
to		120.0	1F	8.801	44.006	0.0		
SP5	61.73	0.0002		0.0	176.423	0.029		Vel = 0.62
SP5	0.0	6.357	1T	37.72	71.750	36.236		
to		120.0		0.0	37.720	0.0		
SP6	61.73	0.0002		0.0	109.470	0.018		Vel = 0.62
SP6	0.0	6.357	2E	35.205	25.417	36.254		
to		120.0		0.0	35.205	0.0		
SP7	61.73	0.0001		0.0	60.622	0.009		Vel = 0.62
SP7	0.0	6.357	1E	17.603	10.583	36.263		
to		120.0		0.0	17.603	4.584		
SP8	61.73	0.0001		0.0	28.186	0.004		Vel = 0.62
SP8	0.0	6.357	1E	17.603	11.833	40.851		
to		120.0		0.0	17.603	0.0		
TOS	61.73	0.0002		0.0	29.436	0.005		Vel = 0.62
TOS	0.0	6.357	1T	37.72	5.250	40.856		
to		120.0		0.0	37.720	2.274		
BOS	61.73	0.0002		0.0	42.970	0.007		Vel = 0.62

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
BOS	0.0	3.26	1Zcb	0.0	4.000	43.137		
to		140.0		0.0	0.0	8.785		* * Fixed Loss = 7.053
FLG	61.73	0.0032		0.0	4.000	0.013		Vel = 2.37
FLG	0.0	8.27	1E	28.468	11.000	51.935		
to		140.0		0.0	28.468	2.599		
CH1	61.73	0.0		0.0	39.468	0.001		Vel = 0.37
CH1	0.0	7.68	1T	43.857	56.500	54.535		
to		150.0	1B	15.037	58.894	0.0		
UG1	61.73	0.0		0.0	115.394	0.005		Vel = 0.43
	0.0							
	61.73					54.540		K Factor = 8.36
UG1	-931.65	7.68	4F	45.11	1029.417	54.540		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-931.65	-0.0065		0.0	1118.384	-7.234		Vel = 6.45
UG2	0.0	7.68	1T	43.857	312.417	47.306		
to		150.0		0.0	43.857	0.0		
UG3	-931.65	-0.0065		0.0	356.274	-2.305		Vel = 6.45
UG3	0.0	7.68	1T	43.857	33.117	45.001		
to		150.0	1Zcg	0.0	43.857	8.280		* * Fixed Loss = 8.28
CT1	-931.65	-0.0065		0.0	76.974	-0.498		Vel = 6.45
CT1	0.0	11.2	1T	66.446	456.417	52.783		
to		150.0		0.0	66.446	0.0		
CT2	-931.65	-0.0010		0.0	522.863	-0.538		Vel = 3.03
CT2	-211.73	11.2	1T	66.446	267.583	52.245		
to		150.0		0.0	66.446	0.0		
CT3	-1143.38	-0.0015		0.0	334.029	-0.503		Vel = 3.72
CT3	0.0	5.86	1T	38.342	192.333	51.742		
to		150.0	1F	8.947	47.288	11.248		* * Fixed Loss = 11.248
UG1	-1143.38	-0.0353	1Zcg	0.0	239.621	-8.450		Vel = 13.60
	0.0							
	-1143.38					54.540		K Factor = -154.82
CT2	211.73	6.16	1E	20.084	22.500	52.245		
to		140.0	1G	4.304	67.425	-3.248		
CTY	211.73	0.0014	1T	43.037	89.925	0.124		Vel = 2.28
	0.0							
	211.73					49.121		K Factor = 30.21



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section A Low Pressure Dry System Remote 3.WXF

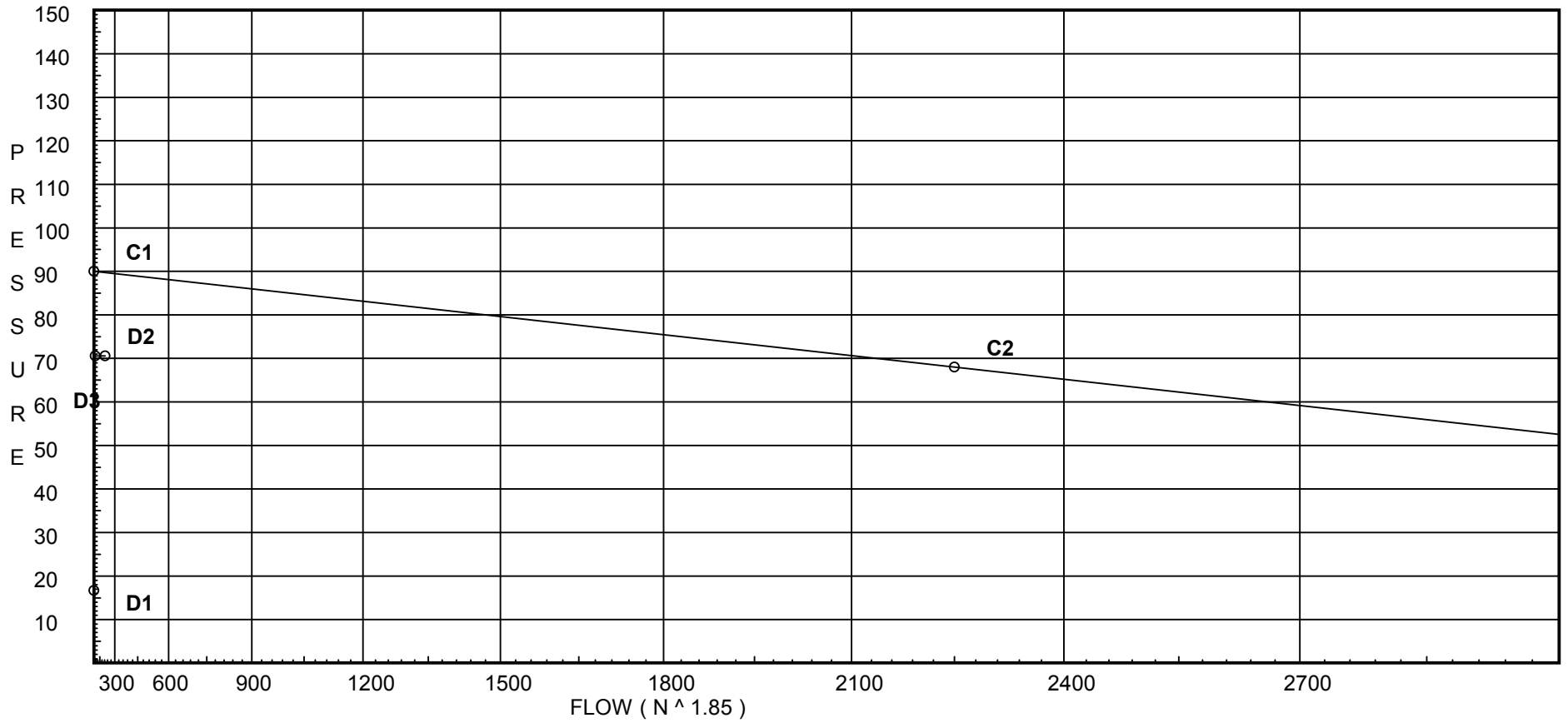
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 16.674
- D2 - System Flow : 64.625
- D2 - System Pressure : 70.591
- Hose (Demand) : 150
- D3 - System Demand : 214.625
- Safety Margin : 19.124



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S30	41.0	4.9	8.2	na	14.03	0.05	256	8.2
T31	41.417		10.18	na				
S31	41.0	4.9	9.92	na	15.43	0.05	256	8.2
S32	41.0	4.9	12.93	na	17.62	0.05	256	8.2
S33	41.0	4.9	12.81	na	17.54	0.05	256	8.2
400	41.417		33.7	na				
401	41.417		14.98	na				
402	41.417		14.84	na				
403	41.417		14.97	na				
TOD1	41.417		40.62	na				
BOD1	35.917		45.34	na				
DPVF	20.833		54.57	na				
SP2	20.833		57.6	na				
SP3	20.833		57.61	na				
SP3A	20.833		57.62	na				
SP4	20.833		57.63	na				
SP5	20.833		57.69	na				
SP6	20.833		57.71	na				
SP7	20.833		57.71	na				
SP8	10.25		62.3	na				
TOS	10.25		62.31	na				
BOS	5.0		64.59	na				
FLG	1.0		73.38	na				
CH1	-5.0		75.98	na				
UG1	-5.0		75.99	na	150.0			
UG2	-5.0		68.77	na				
UG3	-5.0		66.47	na				
CT1	-5.0		74.25	na				
CT2	-5.0		73.71	na				
CT3	-5.0		73.21	na				
CTY	2.5		70.59	na				

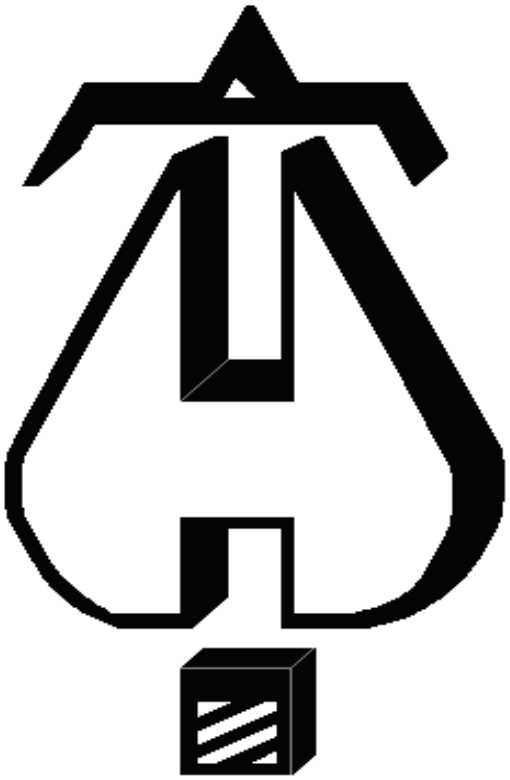
The maximum velocity is 15.76 and it occurs in the pipe between nodes T31 and 401

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S30	14.03	0.874	1N	7.0	9.917	8.200		K Factor = 4.90
to		150.0	1O	3.0	10.000	-0.181		
T31	14.03	0.1088		0.0	19.917	2.166		Vel = 7.50
T31	15.44	0.874	1O	3.0	8.167	10.185		
to		150.0		0.0	3.000	0.0		
401	29.47	0.4290		0.0	11.167	4.791		Vel = 15.76
	0.0							
	29.47					14.976		K Factor = 7.62
S31	15.43	0.874	1O	3.0	0.417	9.922		K Factor = 4.90
to		150.0		0.0	3.000	-0.181		
T31	15.43	0.1299		0.0	3.417	0.444		Vel = 8.25
	0.0							
	15.43					10.185		K Factor = 4.83
S32	17.62	0.874	1N	7.0	3.417	12.931		K Factor = 4.90
to		150.0	1O	3.0	10.000	-0.181		
403	17.62	0.1657		0.0	13.417	2.223		Vel = 9.42
	0.0							
	17.62					14.973		K Factor = 4.55
S33	17.54	0.874	1N	7.0	3.417	12.812		K Factor = 4.90
to		150.0	1O	3.0	10.000	-0.181		
402	17.54	0.1643		0.0	13.417	2.205		Vel = 9.38
	0.0							
	17.54					14.836		K Factor = 4.55
400	-36.92	1.394	4N	32.0	152.917	33.700		
to		120.0		0.0	32.000	0.0		
401	-36.92	-0.1013		0.0	184.917	-18.724		Vel = 7.76
401	29.47	1.394	1N	8.0	18.750	14.976		
to		120.0		0.0	8.000	0.0		
402	-7.45	-0.0052		0.0	26.750	-0.140		Vel = 1.57
402	17.54	1.394		0.0	15.000	14.836		
to		120.0		0.0	0.0	0.0		
403	10.09	0.0091		0.0	15.000	0.137		Vel = 2.12
403	17.62	1.394	2N	16.0	292.417	14.973		
to		120.0	1O	6.0	22.000	0.0		
400	27.71	0.0596		0.0	314.417	18.727		Vel = 5.83
	0.0							
	27.71					33.700		K Factor = 4.77
400	64.63	1.394	2N	16.0	20.667	33.700		
to		150.0		0.0	16.000	0.0		
TOD1	64.63	0.1888		0.0	36.667	6.924		Vel = 13.59
TOD1	0.0	1.61	1Dvc	3.0	5.500	40.624		
to		120.0	1T	8.0	11.000	2.382		
BOD1	64.63	0.1415		0.0	16.500	2.334		Vel = 10.19
BOD1	0.0	1.61	1E	4.0	15.084	45.340		
to		120.0		0.0	4.000	6.533		
DPVF	64.63	0.1415		0.0	19.084	2.700		Vel = 10.19
DPVF	0.0	1.61	1T	8.0	13.417	54.573		
to		120.0		0.0	8.000	0.0		
SP2	64.63	0.1414		0.0	21.417	3.029		Vel = 10.19

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							
	64.63					57.602		K Factor = 8.52
SP2	64.63	6.357	1E	17.603	16.917	57.602		
to		120.0		0.0	17.603	0.0		
SP3	64.63	0.0002		0.0	34.520	0.006		Vel = 0.65
SP3	0.0	6.357		0.0	75.250	57.608		
to		120.0		0.0	0.0	0.0		
SP3A	64.63	0.0002		0.0	75.250	0.014		Vel = 0.65
SP3A	0.0	6.357	1T	37.72	1.917	57.622		
to		120.0		0.0	37.720	0.0		
SP4	64.63	0.0002		0.0	39.637	0.007		Vel = 0.65
SP4	0.0	6.357	2E	35.205	260.500	57.629		
to		120.0	1F	8.801	81.726	0.0		
SP5	64.63	0.0002	1T	37.72	342.226	0.060		Vel = 0.65
SP5	0.0	6.357	1T	37.72	71.750	57.689		
to		120.0		0.0	37.720	0.0		
SP6	64.63	0.0002		0.0	109.470	0.019		Vel = 0.65
SP6	0.0	6.357	1E	17.603	16.167	57.708		
to		120.0		0.0	17.603	0.0		
SP7	64.63	0.0002		0.0	33.770	0.006		Vel = 0.65
SP7	0.0	6.357	1E	17.603	10.583	57.714		
to		120.0		0.0	17.603	4.584		
SP8	64.63	0.0002		0.0	28.186	0.005		Vel = 0.65
SP8	0.0	6.357	2E	35.205	5.917	62.303		
to		120.0		0.0	35.205	0.0		
TOS	64.63	0.0002		0.0	41.122	0.007		Vel = 0.65
TOS	0.0	6.357	1T	37.72	5.250	62.310		
to		120.0		0.0	37.720	2.274		
BOS	64.63	0.0002		0.0	42.970	0.007		Vel = 0.65
BOS	0.0	3.26	1Zcb	0.0	4.000	64.591		
to		140.0		0.0	0.0	8.777		* * Fixed Loss = 7.044
FLG	64.63	0.0035		0.0	4.000	0.014		Vel = 2.48
FLG	0.0	8.27	1E	28.468	11.000	73.382		
to		140.0		0.0	28.468	2.599		
CH1	64.63	0.0		0.0	39.468	0.001		Vel = 0.39
CH1	0.0	7.68	1T	43.857	56.500	75.982		
to		150.0	1B	15.037	58.894	0.0		
UG1	64.63	0.0		0.0	115.394	0.005		Vel = 0.45
	0.0							
	64.63					75.987		K Factor = 7.41
UG1	-930.79	7.68	4F	45.11	1029.417	75.987		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-930.79	-0.0065		0.0	1118.384	-7.221		Vel = 6.45
UG2	0.0	7.68	1T	43.857	312.417	68.766		
to		150.0		0.0	43.857	0.0		
UG3	-930.79	-0.0065		0.0	356.274	-2.301		Vel = 6.45
UG3	0.0	7.68	1T	43.857	33.117	66.465		
to		150.0	1Zcg	0.0	43.857	8.281		* * Fixed Loss = 8.281
CT1	-930.79	-0.0065		0.0	76.974	-0.497		Vel = 6.45

Final Calculations - Hazen-Williams

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
CT1	0.0	11.2	1T	66.446	456.417	74.249		
to		150.0		0.0	66.446	0.0		
CT2	-930.79	-0.0010		0.0	522.863	-0.537		Vel = 3.03
CT2	-214.63	11.2	1T	66.446	267.583	73.712		
to		150.0		0.0	66.446	0.0		
CT3	-1145.42	-0.0015		0.0	334.029	-0.505		Vel = 3.73
CT3	0.0	5.86	1T	38.342	192.333	73.207		
to		150.0	1F	8.947	47.288	11.258		* * Fixed Loss = 11.258
UG1	-1145.42	-0.0354	1Zcg	0.0	239.621	-8.478		Vel = 13.63
	0.0							
	-1145.42					75.987		K Factor = -131.40
CT2	214.62	6.16	1E	20.084	22.500	73.712		
to		140.0	1G	4.304	67.425	-3.248		
CTY	214.62	0.0014	1T	43.037	89.925	0.127		Vel = 2.31
	0.0							
	214.62					70.591		K Factor = 25.54



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section A Low Pressure Dry System Remote 4.WXF

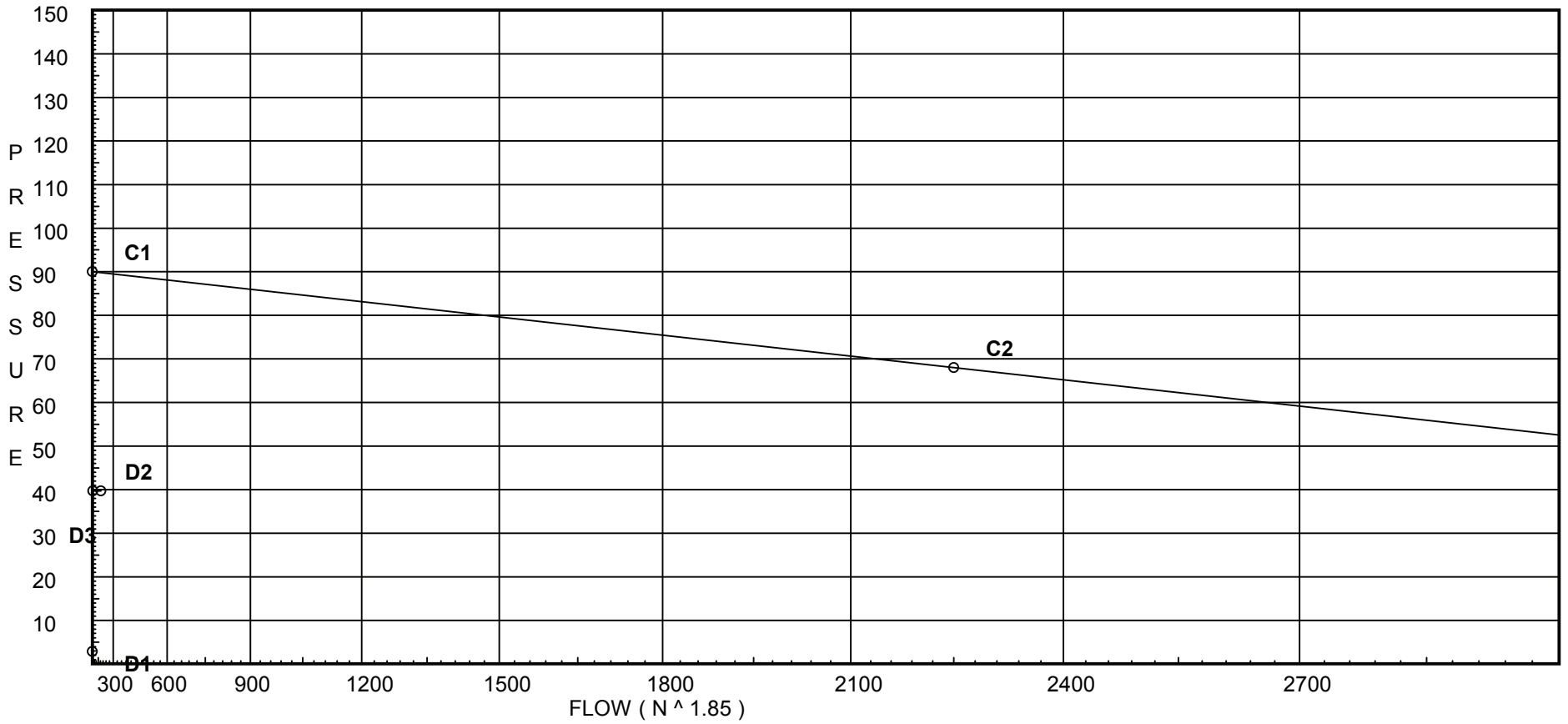
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 2.851
- D2 - System Flow : 37.355
- D2 - System Pressure : 39.725
- Hose (Demand) : 150
- D3 - System Demand : 187.355
- Safety Margin : 50.054



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

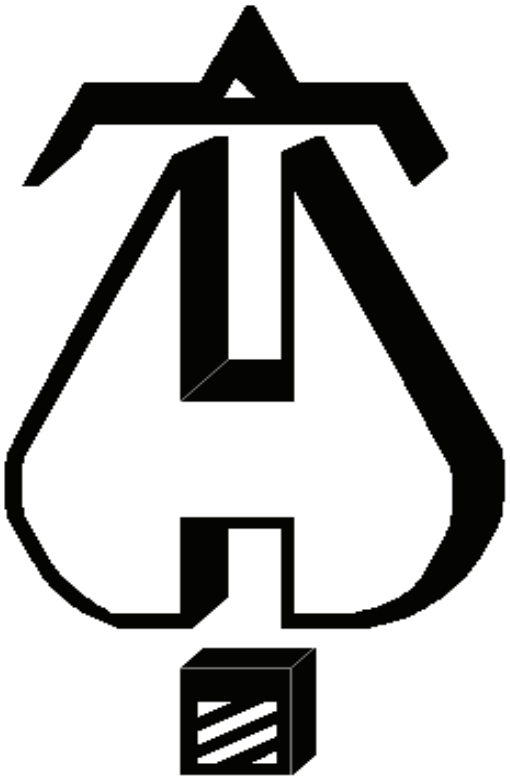
Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S40	9.083	5.6	9.99	na	17.7	0.15	118	7.0
T41	9.5		12.83	na				
S41	9.083	5.6	12.32	na	19.65	0.15	118	7.0
S50	9.083		20.76	na				
S51	9.083		20.76	na				
S52	9.083		21.04	na				
S53	9.083		21.04	na				
S54	9.083		21.35	na				
100	9.5		15.05	na				
101	9.5		20.58	na				
102	9.5		20.86	na				
103	9.5		21.17	na				
TOD3	9.5		29.83	na				
BOD3	4.0		32.72	na				
DF3	4.0		32.83	na				
DPVF	20.833		26.96	na				
SP2	20.833		27.31	na				
SP3	20.833		27.31	na				
SP3A	20.833		27.32	na				
SP4	20.833		27.32	na				
SP4X	20.833		27.33	na				
SP5	20.833		27.34	na				
SP6	20.833		27.35	na				
SP7	20.833		27.36	na				
SP8	10.25		31.94	na				
TOS	10.25		31.94	na				
BOS	5.0		34.22	na				
FLG	1.0		42.68	na				
CH1	-5.0		45.28	na				
UG1	-5.0		45.28	na	150.0			
UG2	-5.0		37.98	na				
UG3	-5.0		35.65	na				
CT1	-5.0		43.42	na				
CT2	-5.0		42.87	na				
CT3	-5.0		42.39	na				
CTY	2.5		39.72	na				

The maximum velocity is 19.97 and it occurs in the pipe between nodes T41 and 100

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S40	17.70	0.874	1N	7.0	11.084	9.990		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T41	17.7	0.1671		0.0	18.084	3.022		Vel = 9.47
T41	19.65	0.874	1O	3.0	0.333	12.831		
to		150.0		0.0	3.000	0.0		
100	37.35	0.6655		0.0	3.333	2.218		Vel = 19.97
	0.0							
	37.35					15.049		K Factor = 9.63
S41	19.65	0.874	1O	3.0	0.417	12.319		K Factor = 5.60
to		150.0		0.0	3.000	-0.181		
T41	19.65	0.2028		0.0	3.417	0.693		Vel = 10.51
	0.0							
	19.65					12.831		K Factor = 5.49
S50	0.0	0.874	1N	7.0	2.667	20.759		
to		150.0	1O	3.0	10.000	-0.181		
101	0.0	0.0		0.0	12.667	0.0		Vel = 0
	0.0							
	0.0					20.578		K Factor = 0
S51	0.0	0.874	1N	7.0	11.500	20.759		
to		150.0	1O	3.0	10.000	-0.181		
101	0.0	0.0		0.0	21.500	0.0		Vel = 0
	0.0							
	0.0					20.578		K Factor = 0
S52	0.0	0.874	2O	6.0	0.417	21.038		
to		150.0		0.0	6.000	-0.181		
102	0.0	0.0		0.0	6.417	0.0		Vel = 0
	0.0							
	0.0					20.857		K Factor = 0
S53	0.0	0.874	1N	7.0	11.500	21.038		
to		150.0	1O	3.0	10.000	-0.181		
102	0.0	0.0		0.0	21.500	0.0		Vel = 0
	0.0							
	0.0					20.857		K Factor = 0
S54	0.0	0.874	1N	7.0	6.917	21.352		
to		150.0	1O	3.0	10.000	-0.181		
103	0.0	0.0		0.0	16.917	0.0		Vel = 0
	0.0							
	0.0					21.171		K Factor = 0
100	37.35	1.598	4N	36.0	121.000	15.049		
to		150.0		0.0	36.000	0.0		
101	37.35	0.0352		0.0	157.000	5.529		Vel = 5.97
101	0.0	1.598		0.0	7.917	20.578		
to		150.0		0.0	0.0	0.0		
102	37.35	0.0352		0.0	7.917	0.279		Vel = 5.97
102	0.0	1.598		0.0	8.917	20.857		
to		150.0		0.0	0.0	0.0		
103	37.35	0.0352		0.0	8.917	0.314		Vel = 5.97

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
103	0.0	1.598	6N	54.0	191.833	21.171		
to		150.0		0.0	54.000	0.0		
TOD3	37.35	0.0352		0.0	245.833	8.659		Vel = 5.97
TOD3	0.0	1.682	1Dvc	3.712	5.500	29.830		
to		120.0	1Ball	3.094	6.806	2.382		
BOD3	37.35	0.0414		0.0	12.306	0.510		Vel = 5.39
BOD3	0.0	1.61		0.0	1.500	32.722		
to		100.0		0.0	0.0	0.0		
DF3	37.35	0.0720		0.0	1.500	0.108		Vel = 5.89
DF3	0.0	1.61	1E	2.855	16.833	32.830		
to		100.0		0.0	2.855	-7.290		
DPVF	37.35	0.0719		0.0	19.688	1.415		Vel = 5.89
DPVF	0.0	2.067	1T	10.0	13.417	26.955		
to		120.0		0.0	10.000	0.0		
SP2	37.35	0.0152		0.0	23.417	0.356		Vel = 3.57
	0.0							
	37.35					27.311		K Factor = 7.15
SP2	37.35	6.357	1E	17.603	16.917	27.311		
to		120.0		0.0	17.603	0.0		
SP3	37.35	0.0001		0.0	34.520	0.002		Vel = 0.38
SP3	0.0	6.357	1T	37.72	77.250	27.313		
to		120.0		0.0	37.720	0.0		
SP3A	37.35	0.0001		0.0	114.970	0.008		Vel = 0.38
SP3A	0.0	6.357	1T	37.72	2.000	27.321		
to		120.0		0.0	37.720	0.0		
SP4	37.35	0.0001		0.0	39.720	0.002		Vel = 0.38
SP4	0.0	6.357	1T	37.72	128.083	27.323		
to		120.0		0.0	37.720	0.0		
SP4X	37.35	0.0001		0.0	165.803	0.011		Vel = 0.38
SP4X	0.0	6.357	2E	35.205	132.417	27.334		
to		120.0	1F	8.801	44.006	0.0		
SP5	37.35	0.0001		0.0	176.423	0.011		Vel = 0.38
SP5	0.0	6.357	1T	37.72	71.750	27.345		
to		120.0		0.0	37.720	0.0		
SP6	37.35	0.0001		0.0	109.470	0.007		Vel = 0.38
SP6	0.0	6.357	2E	35.205	25.417	27.352		
to		120.0		0.0	35.205	0.0		
SP7	37.35	0.0001		0.0	60.622	0.004		Vel = 0.38
SP7	0.0	6.357	1E	17.603	10.583	27.356		
to		120.0		0.0	17.603	4.584		
SP8	37.35	0.0		0.0	28.186	0.001		Vel = 0.38
SP8	0.0	6.357	1E	17.603	11.833	31.941		
to		120.0		0.0	17.603	0.0		
TOS	37.35	0.0001		0.0	29.436	0.002		Vel = 0.38
TOS	0.0	6.357	1T	37.72	5.250	31.943		
to		120.0		0.0	37.720	2.274		
BOS	37.35	0.0001		0.0	42.970	0.003		Vel = 0.38
BOS	0.0	3.26	1Zcb	0.0	4.000	34.220		
to		140.0		0.0	0.0	8.459		* * Fixed Loss = 6.727
FLG	37.35	0.0012		0.0	4.000	0.005		Vel = 1.44

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
FLG	0.0	8.27	1E	28.468	11.000	42.684		
to		140.0		0.0	28.468	2.599		
CH1	37.35	0.0		0.0	39.468	0.0		Vel = 0.22
CH1	0.0	7.68	1T	43.857	56.500	45.283		
to		150.0	1B	15.037	58.894	0.0		
UG1	37.35	0.0		0.0	115.394	0.002		Vel = 0.26
	0.0							
	37.35					45.285		K Factor = 5.55
UG1	-936.76	7.68	4F	45.11	1029.417	45.285		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-936.76	-0.0065		0.0	1118.384	-7.308		Vel = 6.49
UG2	0.0	7.68	1T	43.857	312.417	37.977		
to		150.0		0.0	43.857	0.0		
UG3	-936.76	-0.0065		0.0	356.274	-2.327		Vel = 6.49
UG3	0.0	7.68	1T	43.857	33.117	35.650		
to		150.0	1Zcg	0.0	43.857	8.271		* * Fixed Loss = 8.271
CT1	-936.76	-0.0065		0.0	76.974	-0.504		Vel = 6.49
CT1	0.0	11.2	1T	66.446	456.417	43.417		
to		150.0		0.0	66.446	0.0		
CT2	-936.76	-0.0010		0.0	522.863	-0.544		Vel = 3.05
CT2	-187.35	11.2	1T	66.446	267.583	42.873		
to		150.0		0.0	66.446	0.0		
CT3	-1124.11	-0.0015		0.0	334.029	-0.487		Vel = 3.66
CT3	0.0	5.86	1T	38.342	192.333	42.386		
to		150.0	1F	8.947	47.288	11.087		* * Fixed Loss = 11.087
UG1	-1124.11	-0.0342	1Zcg	0.0	239.621	-8.188		Vel = 13.37
	0.0							
	-1124.11					45.285		K Factor = -167.04
CT2	187.36	6.16	1E	20.084	22.500	42.873		
to		140.0	1G	4.304	67.425	-3.248		
CTY	187.36	0.0011	1T	43.037	89.925	0.100		Vel = 2.02
	0.0							
	187.36					39.725		K Factor = 29.73



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section A Low Pressure Dry System Remote 5.WXF

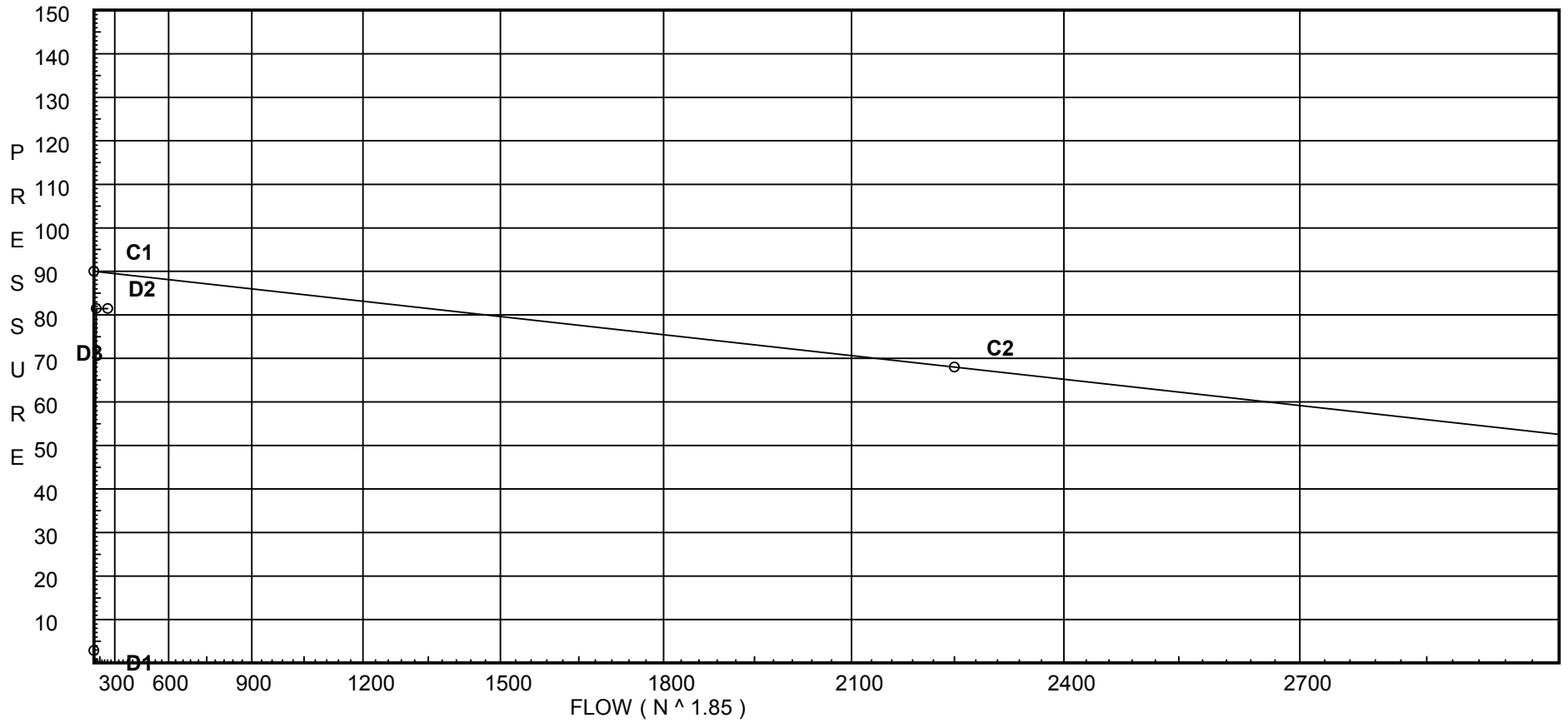
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 2.851
- D2 - System Flow : 92.395
- D2 - System Pressure : 81.439
- Hose (Demand) : 150
- D3 - System Demand : 242.395
- Safety Margin : 8.205



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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.

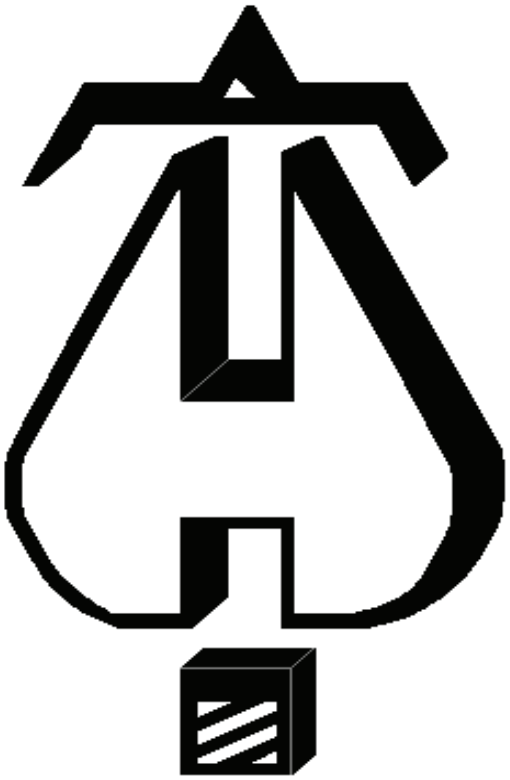
Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S40	9.083		13.32	na				
T41	9.5		13.14	na				
S41	9.083		13.32	na				
S50	9.083	5.6	11.01	na	18.58	0.15	105	7.0
S51	9.083	5.6	9.79	na	17.53	0.15	105	7.0
S52	9.083	5.6	12.28	na	19.63	0.15	105	7.0
S53	9.083	5.6	9.99	na	17.7	0.15	118	7.0
S54	9.083	5.6	11.47	na	18.96	0.15	123	7.0
100	9.5		13.14	na				
101	9.5		13.14	na				
102	9.5		13.4	na				
103	9.5		14.5	na				
TOD3	9.5		60.74	na				
BOD3	4.0		65.85	na				
DF3	4.0		66.42	na				
DPVF	20.833		66.69	na				
SP2	20.833		68.6	na				
SP3	20.833		68.61	na				
SP3A	20.833		68.65	na				
SP4	20.833		68.66	na				
SP4X	20.833		68.72	na				
SP5	20.833		68.78	na				
SP6	20.833		68.81	na				
SP7	20.833		68.83	na				
SP8	10.25		73.43	na				
TOS	10.25		73.44	na				
BOS	5.0		75.73	na				
FLG	1.0		84.05	na				
CH1	-5.0		86.66	na				
UG1	-5.0		86.67	na	150.0			
UG2	-5.0		79.53	na				
UG3	-5.0		77.26	na				
CT1	-5.0		85.06	na				
CT2	-5.0		84.53	na				
CT3	-5.0		84.0	na				
CTY	2.5		81.44	na				

The maximum velocity is 14.78 and it occurs in the pipe between nodes 103 and TOD3

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S40	0.0	0.874	1N	7.0	11.084	13.321		
to		150.0		0.0	7.000	-0.181		
T41	0.0	0.0		0.0	18.084	0.0		Vel = 0
T41	0.0	0.874	1O	3.0	0.333	13.140		
to		150.0		0.0	3.000	0.0		
100	0.0	0.0		0.0	3.333	0.0		Vel = 0
	0.0							
	0.0					13.140		K Factor = 0
S41	0.0	0.874	1O	3.0	0.417	13.321		
to		150.0		0.0	3.000	-0.181		
T41	0.0	0.0		0.0	3.417	0.0		Vel = 0
	0.0							
	0.0					13.140		K Factor = 0
S50	18.58	0.874	1N	7.0	2.667	11.006		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
101	18.58	0.1828		0.0	12.667	2.315		Vel = 9.94
	0.0							
	18.58					13.140		K Factor = 5.13
S51	17.53	0.874	1N	7.0	11.500	9.794		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
101	17.53	0.1640		0.0	21.500	3.527		Vel = 9.37
	0.0							
	17.53					13.140		K Factor = 4.84
S52	19.63	0.874	2O	6.0	0.417	12.284		K Factor = 5.60
to		150.0		0.0	6.000	-0.181		
102	19.63	0.2024		0.0	6.417	1.299		Vel = 10.50
	0.0							
	19.63					13.402		K Factor = 5.36
S53	17.70	0.874	1N	7.0	11.500	9.990		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
102	17.7	0.1671		0.0	21.500	3.593		Vel = 9.47
	0.0							
	17.70					13.402		K Factor = 4.83
S54	18.96	0.874	1N	7.0	6.917	11.468		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
103	18.96	0.1899		0.0	16.917	3.212		Vel = 10.14
	0.0							
	18.96					14.499		K Factor = 4.98
100	0.0	1.598	4N	36.0	121.000	13.140		
to		150.0		0.0	36.000	0.0		
101	0.0	0.0		0.0	157.000	0.0		Vel = 0
101	36.10	1.598		0.0	7.917	13.140		
to		150.0		0.0	0.0	0.0		
102	36.1	0.0331		0.0	7.917	0.262		Vel = 5.77
102	37.33	1.598		0.0	8.917	13.402		
to		150.0		0.0	0.0	0.0		
103	73.43	0.1230		0.0	8.917	1.097		Vel = 11.75

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
103	18.96	1.598	6N	54.0	191.833	14.499		
to		150.0		0.0	54.000	0.0		
TOD3	92.39	0.1881		0.0	245.833	46.242		Vel = 14.78
TOD3	0.0	1.682	1Dvc	3.712	5.500	60.741		
to		120.0	1Ball	3.094	6.806	2.382		
BOD3	92.39	0.2214		0.0	12.306	2.725		Vel = 13.34
BOD3	0.0	1.61		0.0	1.500	65.848		
to		100.0		0.0	0.0	0.0		
DF3	92.39	0.3840		0.0	1.500	0.576		Vel = 14.56
DF3	0.0	1.61	1E	2.855	16.833	66.424		
to		100.0		0.0	2.855	-7.290		
DPVF	92.39	0.3840		0.0	19.688	7.560		Vel = 14.56
DPVF	0.0	2.067	1T	10.0	13.417	66.694		
to		120.0		0.0	10.000	0.0		
SP2	92.39	0.0812		0.0	23.417	1.901		Vel = 8.83
	0.0							
	92.39					68.595		K Factor = 11.16
SP2	92.39	6.357	1E	17.603	16.917	68.595		
to		120.0		0.0	17.603	0.0		
SP3	92.39	0.0003		0.0	34.520	0.012		Vel = 0.93
SP3	0.0	6.357	1T	37.72	77.250	68.607		
to		120.0		0.0	37.720	0.0		
SP3A	92.39	0.0003		0.0	114.970	0.039		Vel = 0.93
SP3A	0.0	6.357	1T	37.72	2.000	68.646		
to		120.0		0.0	37.720	0.0		
SP4	92.39	0.0004		0.0	39.720	0.014		Vel = 0.93
SP4	0.0	6.357	1T	37.72	128.083	68.660		
to		120.0		0.0	37.720	0.0		
SP4X	92.39	0.0003		0.0	165.803	0.056		Vel = 0.93
SP4X	0.0	6.357	2E	35.205	132.417	68.716		
to		120.0	1F	8.801	44.006	0.0		
SP5	92.39	0.0003		0.0	176.423	0.060		Vel = 0.93
SP5	0.0	6.357	1T	37.72	71.750	68.776		
to		120.0		0.0	37.720	0.0		
SP6	92.39	0.0003		0.0	109.470	0.038		Vel = 0.93
SP6	0.0	6.357	2E	35.205	25.417	68.814		
to		120.0		0.0	35.205	0.0		
SP7	92.39	0.0003		0.0	60.622	0.020		Vel = 0.93
SP7	0.0	6.357	1E	17.603	10.583	68.834		
to		120.0		0.0	17.603	4.584		
SP8	92.39	0.0004		0.0	28.186	0.010		Vel = 0.93
SP8	0.0	6.357	1E	17.603	11.833	73.428		
to		120.0		0.0	17.603	0.0		
TOS	92.39	0.0003		0.0	29.436	0.010		Vel = 0.93
TOS	0.0	6.357	1T	37.72	5.250	73.438		
to		120.0		0.0	37.720	2.274		
BOS	92.39	0.0003		0.0	42.970	0.014		Vel = 0.93
BOS	0.0	3.26	1Zcb	0.0	4.000	75.726		
to		140.0		0.0	0.0	8.301		* * Fixed Loss = 6.569
FLG	92.39	0.0068		0.0	4.000	0.027		Vel = 3.55

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
FLG	0.0	8.27	1E	28.468	11.000	84.054		
to		140.0		0.0	28.468	2.599		
CH1	92.39	0.0001		0.0	39.468	0.003		Vel = 0.55
CH1	0.0	7.68	1T	43.857	56.500	86.656		
to		150.0	1B	15.037	58.894	0.0		
UG1	92.39	0.0001		0.0	115.394	0.010		Vel = 0.64
	0.0							
	92.39					86.666		K Factor = 9.92
UG1	-924.80	7.68	4F	45.11	1029.417	86.666		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-924.8	-0.0064		0.0	1118.384	-7.136		Vel = 6.40
UG2	0.0	7.68	1T	43.857	312.417	79.530		
to		150.0		0.0	43.857	0.0		
UG3	-924.8	-0.0064		0.0	356.274	-2.273		Vel = 6.40
UG3	0.0	7.68	1T	43.857	33.117	77.257		
to		150.0	1Zcg	0.0	43.857	8.292		* * Fixed Loss = 8.292
CT1	-924.8	-0.0064		0.0	76.974	-0.491		Vel = 6.40
CT1	0.0	11.2	1T	66.446	456.417	85.058		
to		150.0		0.0	66.446	0.0		
CT2	-924.8	-0.0010		0.0	522.863	-0.531		Vel = 3.01
CT2	-242.39	11.2	1T	66.446	267.583	84.527		
to		150.0		0.0	66.446	0.0		
CT3	-1167.19	-0.0016		0.0	334.029	-0.522		Vel = 3.80
CT3	0.0	5.86	1T	38.342	192.333	84.005		
to		150.0	1F	8.947	47.288	11.440		* * Fixed Loss = 11.44
UG1	-1167.19	-0.0366	1Zcg	0.0	239.621	-8.779		Vel = 13.88
	0.0							
	-1167.19					86.666		K Factor = -125.38
CT2	242.40	6.16	1E	20.084	22.500	84.527		
to		140.0	1G	4.304	67.425	-3.248		
CTY	242.4	0.0018	1T	43.037	89.925	0.160		Vel = 2.61
	0.0							
	242.40					81.439		K Factor = 26.86



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section B Wet System Remote 6.WXF

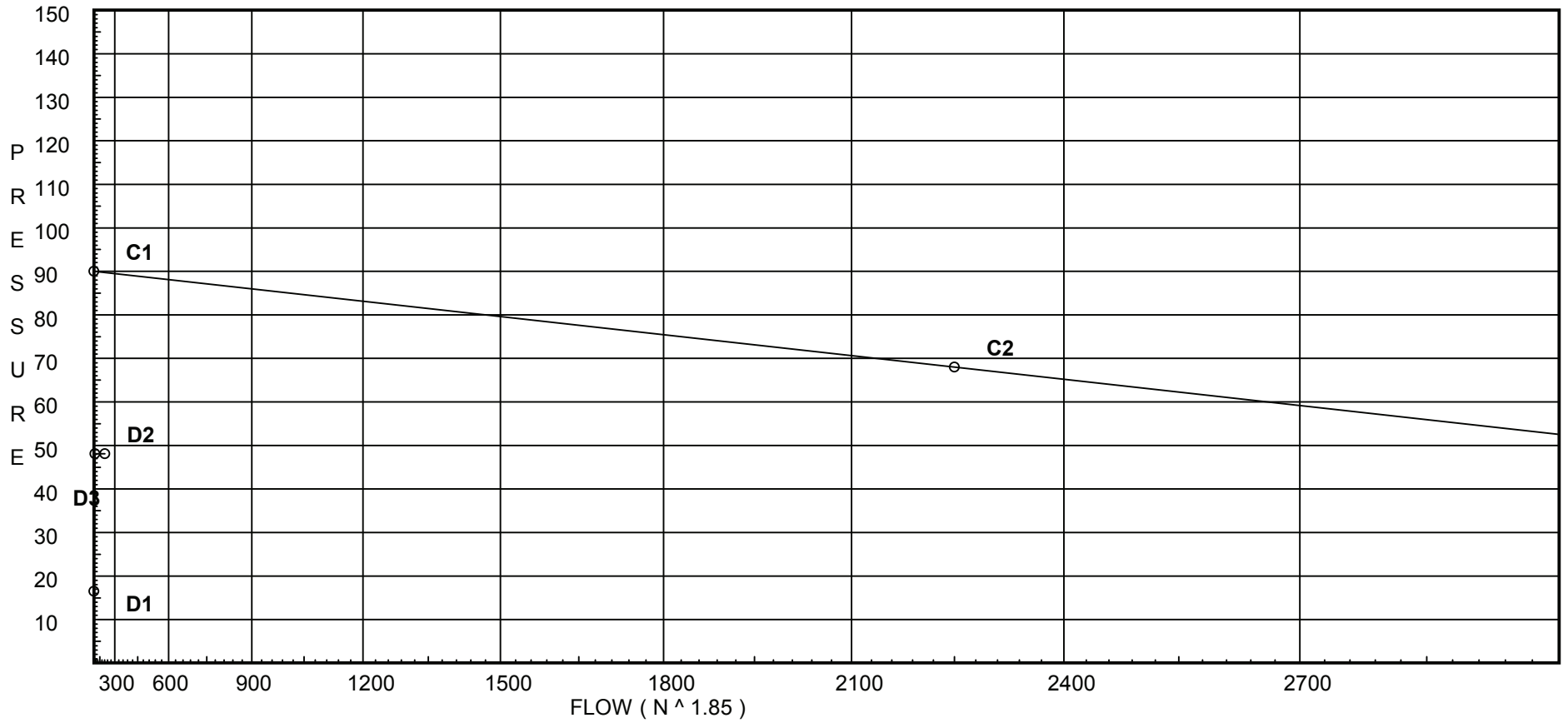
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 16.494
- D2 - System Flow : 61.326
- D2 - System Pressure : 48.091
- Hose (Demand) : 150
- D3 - System Demand : 211.326
- Safety Margin : 41.632



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S70	41.0		26.41	na				
S71	41.0		26.41	na				
400	41.417		26.23	na				
401	41.417		26.23	na				
402	41.417		26.23	na				
TOD2	41.417		26.23	na				
BOD2	35.917		28.61	na				
BOD1	35.917		28.61	na				
DPVF	20.833		35.14	na				
S72	40.583		12.99	na				
B72	30.75		17.25	na				
B76	30.75		17.25	na				
S73	41.0		12.4	na				
B73	30.75		16.84	na				
S74	40.583		12.74	na				
T74	40.583		12.74	na				
B74	30.75		16.99	na				
S75	40.583		12.74	na				
S76	40.583		12.99	na				
S77	40.583		12.79	na				
T77	40.583		12.79	na				
B77	30.75		17.05	na				
S78	40.583		12.79	na				
S79	40.583		12.79	na				
B79	30.75		17.05	na				
S60	40.583	5.6	7.0	na	14.82	0.1	91	7.0
B60	30.75		12.8	na				
S61	40.583	5.6	7.67	na	15.51	0.1	91	7.0
B61	30.75		13.61	na				
S62	40.583	5.6	7.55	na	15.39	0.1	91	7.0
B62	30.75		13.47	na				
S63	40.583	5.6	7.77	na	15.61	0.1	89	7.0
B63	30.75		13.73	na				
300	30.75		22.49	na				
301	30.75		16.93	na				
302	30.75		16.8	na				
303	30.75		16.84	na				
304	30.75		16.84	na				
305	30.75		16.99	na				
306	30.75		17.05	na				
307	30.75		17.25	na				
3RD	30.75		29.23	na				
2ND	20.833		35.06	na				
SP2	20.833		35.14	na				
SP3	20.833		35.14	na				
SP3A	20.833		35.14	na				
SP4	20.833		35.15	na				
SP5	20.833		35.2	na				
SP6	20.833		35.22	na				
SP7	20.833		35.23	na				
SP8	10.25		39.81	na				
TOS	10.25		39.82	na				
BOS	5.0		42.1	na				
FLG	1.0		50.9	na				
CH1	-5.0		53.5	na				
UG1	-5.0		53.51	na	150.0			
UG2	-5.0		46.27	na				
UG3	-5.0		43.97	na				
CT1	-5.0		51.75	na				
CT2	-5.0		51.21	na				
CT3	-5.0		50.71	na				
CTY	2.5		48.09	na				

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.

The maximum velocity is 13.6 and it occurs in the pipe between nodes CT3 and UG1

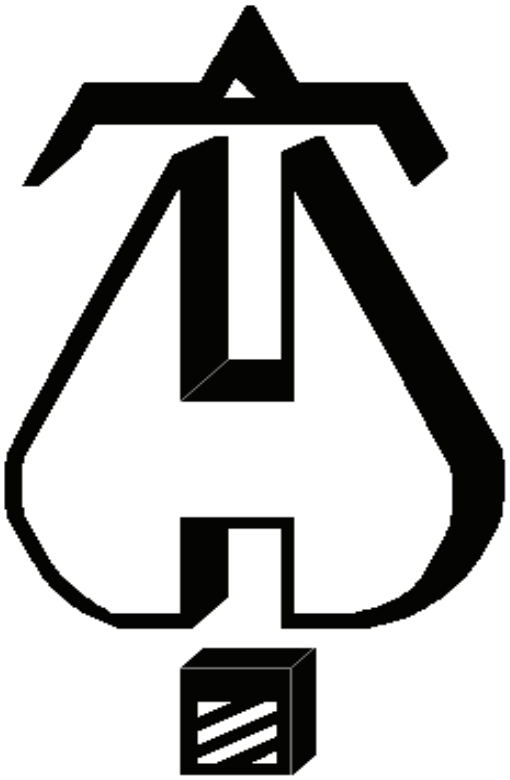
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
S70	0.0	0.874	1N	7.0	3.667	26.408				
to		150.0	1O	3.0	10.000	-0.181				
401	0.0	0.0		0.0	13.667	0.0		Vel = 0		
	0.0									
	0.0					26.227		K Factor = 0		
S71	0.0	0.874	1N	7.0	3.667	26.408				
to		150.0	1O	3.0	10.000	-0.181				
401	0.0	0.0		0.0	13.667	0.0		Vel = 0		
	0.0									
	0.0					26.227		K Factor = 0		
400	0.0	1.394	1N	8.0	131.000	26.227				
to		150.0		0.0	8.000	0.0				
401	0.0	0.0		0.0	139.000	0.0		Vel = 0		
401	0.0	1.394	3N	24.0	146.167	26.227				
to		150.0		0.0	24.000	0.0				
402	0.0	0.0		0.0	170.167	0.0		Vel = 0		
402	0.0	1.394	1O	6.0	13.333	26.227				
to		150.0		0.0	6.000	0.0				
400	0.0	0.0		0.0	19.333	0.0		Vel = 0		
	0.0									
	0.0					26.227		K Factor = 0		
400	0.0	1.394	1N	8.0	81.500	26.227				
to		150.0		0.0	8.000	0.0				
TOD2	0.0	0.0		0.0	89.500	0.0		Vel = 0		
TOD2	0.0	1.61	1E	4.0	5.500	26.227				
to		120.0	1Dvc	3.0	7.000	2.382				
BOD2	0.0	0.0		0.0	12.500	0.0		Vel = 0		
BOD2	0.0	1.61	1T	8.0	2.000	28.609				
to		120.0		0.0	8.000	0.0				
BOD1	0.0	0.0		0.0	10.000	0.0		Vel = 0		
BOD1	0.0	1.61	1E	4.0	15.084	28.609				
to		120.0		0.0	4.000	6.533				
DPVF	0.0	0.0		0.0	19.084	0.0		Vel = 0		
DPVF	0.0	1.61	1T	8.0	13.417	35.142				
to		120.0		0.0	8.000	0.0				
SP2	0.0	0.0		0.0	21.417	0.0		Vel = 0		
	0.0									
	0.0					35.142		K Factor = 0		
S72	0.0	0.874	1O	3.0	9.833	12.990				
to		150.0		0.0	3.000	4.259				
B72	0.0	0.0		0.0	12.833	0.0		Vel = 0		
B72	0.0	0.874	1O	3.0	8.750	17.249				
to		150.0		0.0	3.000	0.0				
B76	0.0	0.0		0.0	11.750	0.0		Vel = 0		
B76	0.0	0.874	1O	3.0	7.167	17.249				
to		150.0		0.0	3.000	0.0				
307	0.0	0.0		0.0	10.167	0.0		Vel = 0		
	0.0									

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					17.249		K Factor = 0		
S73	0.0	0.874	3N	21.0	16.000	12.401				
to		150.0	1O	3.0	24.000	4.439				
B73	0.0	0.0		0.0	40.000	0.0		Vel = 0		
B73	0.0	0.874	1N	7.0	4.167	16.840				
to		150.0	1O	3.0	10.000	0.0				
303	0.0	0.0		0.0	14.167	0.0		Vel = 0		
	0.0									
	0.0					16.840		K Factor = 0		
S74	0.0	0.874	1O	3.0	0.167	12.736				
to		150.0		0.0	3.000	0.0				
T74	0.0	0.0		0.0	3.167	0.0		Vel = 0		
T74	0.0	0.874	1O	3.0	9.833	12.736				
to		150.0		0.0	3.000	4.259				
B74	0.0	0.0		0.0	12.833	0.0		Vel = 0		
B74	0.0	0.874	1O	3.0	6.000	16.995				
to		150.0		0.0	3.000	0.0				
305	0.0	0.0		0.0	9.000	0.0		Vel = 0		
	0.0									
	0.0					16.995		K Factor = 0		
S75	0.0	0.874	1O	3.0	0.167	12.736				
to		150.0		0.0	3.000	0.0				
T74	0.0	0.0		0.0	3.167	0.0		Vel = 0		
	0.0									
	0.0					12.736		K Factor = 0		
S76	0.0	0.874	1O	3.0	9.833	12.990				
to		150.0		0.0	3.000	4.259				
B76	0.0	0.0		0.0	12.833	0.0		Vel = 0		
	0.0									
	0.0					17.249		K Factor = 0		
S77	0.0	0.874	1O	3.0	0.167	12.792				
to		150.0		0.0	3.000	0.0				
T77	0.0	0.0		0.0	3.167	0.0		Vel = 0		
T77	0.0	0.874	1O	3.0	9.833	12.792				
to		150.0		0.0	3.000	4.259				
B77	0.0	0.0		0.0	12.833	0.0		Vel = 0		
B77	0.0	0.874	1N	7.0	3.333	17.051				
to		150.0	1O	3.0	10.000	0.0				
306	0.0	0.0		0.0	13.333	0.0		Vel = 0		
	0.0									
	0.0					17.051		K Factor = 0		
S78	0.0	0.874	1O	3.0	0.167	12.792				
to		150.0		0.0	3.000	0.0				
T77	0.0	0.0		0.0	3.167	0.0		Vel = 0		
	0.0									
	0.0					12.792		K Factor = 0		
S79	0.0	0.874	1O	3.0	9.833	12.792				
to		150.0		0.0	3.000	4.259				
B79	0.0	0.0		0.0	12.833	0.0		Vel = 0		

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
B79	0.0	0.874	1N	7.0	6.250	17.051		
to		150.0	1O	3.0	10.000	0.0		
306	0.0	0.0		0.0	16.250	0.0		Vel = 0
	0.0							
	0.0					17.051		K Factor = 0
S60	14.82	0.874	1O	3.0	9.833	7.000		K Factor = 5.60
to		150.0		0.0	3.000	4.259		
B60	14.82	0.1202		0.0	12.833	1.543		Vel = 7.93
B60	0.0	0.874	2N	14.0	15.750	12.802		
to		150.0	1O	3.0	17.000	13.318		
302A	14.82	0.1202		0.0	32.750	3.938		Vel = 7.93
	0.0							
	14.82					30.058		K Factor = 2.70
S61	15.51	0.874	1O	3.0	9.833	7.669		K Factor = 5.60
to		150.0		0.0	3.000	4.259		
B61	15.51	0.1308		0.0	12.833	1.678		Vel = 8.29
B61	0.0	0.874	2N	14.0	7.750	13.606		
to		150.0	1O	3.0	17.000	0.0		
304	15.51	0.1308		0.0	24.750	3.238		Vel = 8.29
	0.0							
	15.51					16.844		K Factor = 3.78
S62	15.39	0.874	1O	3.0	9.833	7.555		K Factor = 5.60
to		150.0		0.0	3.000	4.259		
B62	15.39	0.1290		0.0	12.833	1.655		Vel = 8.23
B62	0.0	0.874	2N	14.0	9.834	13.469		
to		150.0	1O	3.0	17.000	0.0		
301	15.39	0.1291		0.0	26.834	3.463		Vel = 8.23
	0.0							
	15.39					16.932		K Factor = 3.74
S63	15.61	0.874	1O	3.0	9.833	7.770		K Factor = 5.60
to		150.0		0.0	3.000	4.259		
B63	15.61	0.1324		0.0	12.833	1.699		Vel = 8.35
B63	0.0	0.874	2N	14.0	9.584	13.728		
to		150.0	1O	3.0	17.000	0.0		
307	15.61	0.1324		0.0	26.584	3.521		Vel = 8.35
	0.0							
	15.61					17.249		K Factor = 3.76
300	-25.61	1.394	5N	40.0	117.167	22.491		
to		150.0	1O	6.0	46.000	0.0		
301	-25.61	-0.0341		0.0	163.167	-5.559		Vel = 5.38
301	15.39	1.394	1O	6.0	15.833	16.932		
to		150.0		0.0	6.000	0.0		
302	-10.22	-0.0062		0.0	21.833	-0.136		Vel = 2.15
302	14.82	1.394	1N	8.0	23.333	16.796		
to		150.0		0.0	8.000	0.0		
303	4.6	0.0014		0.0	31.333	0.044		Vel = 0.97
303	0.0	1.394		0.0	3.000	16.840		
to		150.0		0.0	0.0	0.0		
304	4.6	0.0013		0.0	3.000	0.004		Vel = 0.97

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
304	15.50	1.394		0.0	6.917	16.844		
to		150.0		0.0	0.0	0.0		
305	20.1	0.0218		0.0	6.917	0.151		Vel = 4.23
305	0.0	1.394		0.0	2.583	16.995		
to		150.0		0.0	0.0	0.0		
306	20.1	0.0217		0.0	2.583	0.056		Vel = 4.23
306	0.0	1.394		0.0	9.083	17.051		
to		150.0		0.0	0.0	0.0		
307	20.1	0.0218		0.0	9.083	0.198		Vel = 4.23
307	15.61	1.394	1O	6.0	77.167	17.249		
to		150.0		0.0	6.000	0.0		
300	35.71	0.0630		0.0	83.167	5.242		Vel = 7.51
	0.0							
	35.71					22.491		K Factor = 7.53
302	-14.82	1.394		0.0	4.500	16.796		
to		150.0		0.0	0.0	13.318		
302A	-14.82	-0.0124		0.0	4.500	-0.056		Vel = 3.12
	0.0							
	-14.82					30.058		K Factor = -2.70
300	61.33	1.682	3E	14.849	35.833	22.491		
to		120.0	1Ball	3.094	29.080	0.0		
3RD	61.33	0.1038	1S	11.137	64.913	6.735		Vel = 8.86
3RD	0.0	1.682	1E	4.95	9.917	29.226		
to		120.0		0.0	4.950	4.295		
2ND	61.33	0.1038		0.0	14.867	1.543		Vel = 8.86
2ND	0.0	4.26	1E	13.167	30.167	35.064		
to		120.0	1T	26.334	39.501	0.0		
SP3A	61.33	0.0011		0.0	69.668	0.078		Vel = 1.38
	0.0							
	61.33					35.142		K Factor = 10.35
SP2	0.0	6.357	1E	17.603	16.917	35.142		
to		120.0		0.0	17.603	0.0		
SP3	0.0	0.0		0.0	34.520	0.0		Vel = 0
SP3	0.0	6.357		0.0	75.250	35.142		
to		120.0		0.0	0.0	0.0		
SP3A	0.0	0.0		0.0	75.250	0.0		Vel = 0
SP3A	61.33	6.357	1T	37.72	1.917	35.142		
to		120.0		0.0	37.720	0.0		
SP4	61.33	0.0002		0.0	39.637	0.007		Vel = 0.62
SP4	0.0	6.357	2E	35.205	260.500	35.149		
to		120.0	1F	8.801	81.726	0.0		
SP5	61.33	0.0002	1T	37.72	342.226	0.054		Vel = 0.62
SP5	0.0	6.357	1T	37.72	71.750	35.203		
to		120.0		0.0	37.720	0.0		
SP6	61.33	0.0002		0.0	109.470	0.018		Vel = 0.62
SP6	0.0	6.357	1E	17.603	16.167	35.221		
to		120.0		0.0	17.603	0.0		
SP7	61.33	0.0001		0.0	33.770	0.005		Vel = 0.62

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
SP7	0.0	6.357	1E	17.603	10.583	35.226		
to		120.0		0.0	17.603	4.584		
SP8	61.33	0.0001		0.0	28.186	0.004		Vel = 0.62
SP8	0.0	6.357	2E	35.205	5.917	39.814		
to		120.0		0.0	35.205	0.0		
TOS	61.33	0.0002		0.0	41.122	0.007		Vel = 0.62
TOS	0.0	6.357	1T	37.72	5.250	39.821		
to		120.0		0.0	37.720	2.274		
BOS	61.33	0.0001		0.0	42.970	0.006		Vel = 0.62
BOS	0.0	3.26	1Zcb	0.0	4.000	42.101		
to		140.0		0.0	0.0	8.788		* * Fixed Loss = 7.056
FLG	61.33	0.0032		0.0	4.000	0.013		Vel = 2.36
FLG	0.0	8.27	1E	28.468	11.000	50.902		
to		140.0		0.0	28.468	2.599		
CH1	61.33	0.0		0.0	39.468	0.001		Vel = 0.37
CH1	0.0	7.68	1T	43.857	56.500	53.502		
to		150.0	1B	15.037	58.894	0.0		
UG1	61.33	0.0		0.0	115.394	0.005		Vel = 0.42
	0.0							
	61.33					53.507		K Factor = 8.38
UG1	-931.51	7.68	4F	45.11	1029.417	53.507		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-931.51	-0.0065		0.0	1118.384	-7.232		Vel = 6.45
UG2	0.0	7.68	1T	43.857	312.417	46.275		
to		150.0		0.0	43.857	0.0		
UG3	-931.51	-0.0065		0.0	356.274	-2.304		Vel = 6.45
UG3	0.0	7.68	1T	43.857	33.117	43.971		
to		150.0	1Zcg	0.0	43.857	8.280		* * Fixed Loss = 8.28
CT1	-931.51	-0.0065		0.0	76.974	-0.498		Vel = 6.45
CT1	0.0	11.2	1T	66.446	456.417	51.753		
to		150.0		0.0	66.446	0.0		
CT2	-931.51	-0.0010		0.0	522.863	-0.538		Vel = 3.03
CT2	-211.33	11.2	1T	66.446	267.583	51.215		
to		150.0		0.0	66.446	0.0		
CT3	-1142.84	-0.0015		0.0	334.029	-0.502		Vel = 3.72
CT3	0.0	5.86	1T	38.342	192.333	50.713		
to		150.0	1F	8.947	47.288	11.237		* * Fixed Loss = 11.237
UG1	-1142.84	-0.0352	1Zcg	0.0	239.621	-8.443		Vel = 13.60
	0.0							
	-1142.84					53.507		K Factor = -156.24
CT2	211.33	6.16	1E	20.084	22.500	51.215		
to		140.0	1G	4.304	67.425	-3.248		
CTY	211.33	0.0014	1T	43.037	89.925	0.124		Vel = 2.28
	0.0							
	211.33					48.091		K Factor = 30.47



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section B Low Pressure Dry System Remote 7.WXF

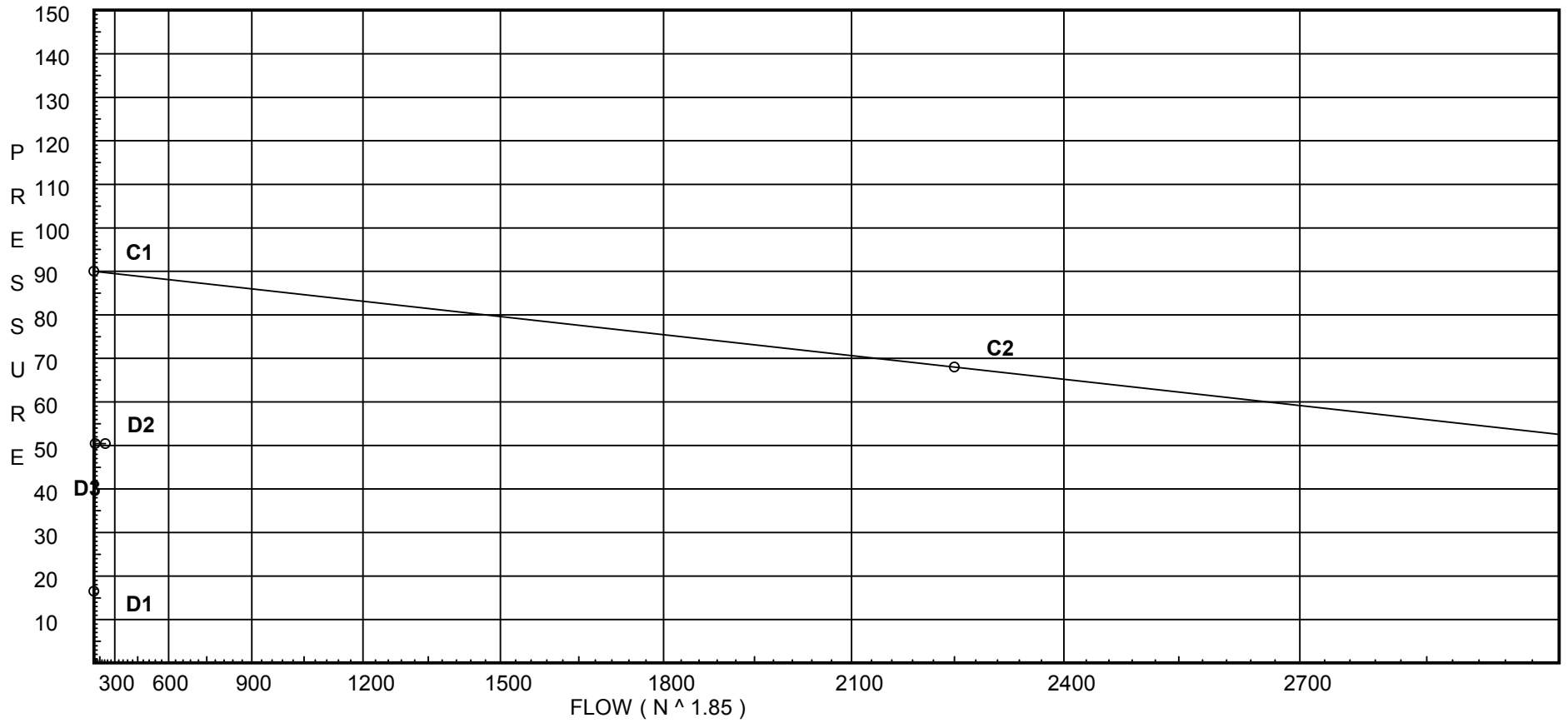
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 16.494
- D2 - System Flow : 68.926
- D2 - System Pressure : 50.437
- Hose (Demand) : 150
- D3 - System Demand : 218.926
- Safety Margin : 39.268



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S70	41.0	4.9	14.13	na	18.42	0.05	256	8.2
S71	41.0	4.9	14.13	na	18.42	0.05	256	8.2
400	41.417		19.39	na				
401	41.417		16.4	na				
402	41.417		19.08	na				
TOD2	41.417		25.36	na				
BOD2	35.917		28.37	na				
BOD1	35.917		28.87	na				
DPVF	20.833		36.36	na				
S72	40.583		24.96	na				
B72	30.75		29.22	na				
B76	30.75		29.22	na				
S73	41.0		24.62	na				
B73	30.75		29.06	na				
S74	40.583	4.4	13.3	na	16.05	0.05	170	13.3
T74	40.583		13.74	na				
B74	30.75		24.45	na				
S75	40.583	4.4	13.3	na	16.05	0.05	170	13.3
S76	40.583		24.96	na				
S77	40.583		24.77	na				
T77	40.583		24.77	na				
B77	30.75		29.02	na				
S78	40.583		24.77	na				
S79	40.583		24.77	na				
B79	30.75		29.02	na				
S60	40.583		25.07	na				
B60	30.75		29.33	na				
S61	40.583		24.77	na				
B61	30.75		29.03	na				
S62	40.583		25.27	na				
B62	30.75		29.53	na				
S63	40.583		24.96	na				
B63	30.75		29.22	na				
300	30.75		30.97	na				
301	30.75		29.53	na				
302	30.75		29.33	na				
303	30.75		29.06	na				
304	30.75		29.03	na				
305	30.75		28.97	na				
306	30.75		29.02	na				
307	30.75		29.22	na				
3RD	30.75		32.65	na				
2ND	20.833		37.41	na				
SP2	20.833		37.43	na				
SP3	20.833		37.43	na				
SP3A	20.833		37.44	na				
SP4	20.833		37.44	na				
SP4X	20.833		37.48	na				
SP5	20.833		37.51	na				
SP6	20.833		37.53	na				
SP7	20.833		37.54	na				
SP8	10.25		42.13	na				
TOS	10.25		42.14	na				
BOS	5.0		44.42	na				
FLG	1.0		53.2	na				
CH1	-5.0		55.8	na				
UG1	-5.0		55.81	na	150.0			
UG2	-5.0		48.6	na				
UG3	-5.0		46.3	na				
CT1	-5.0		54.09	na				
CT2	-5.0		53.55	na				
CT3	-5.0		53.05	na				

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
CTY	2.5		50.44	na				

The maximum velocity is 17.16 and it occurs in the pipe between nodes T74 and B74

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S70	18.42	0.874	1N	7.0	3.667	14.126		K Factor = 4.90
to		150.0	1O	3.0	10.000	-0.181		
401	18.42	0.1798		0.0	13.667	2.458		Vel = 9.85
	0.0							
	18.42					16.403		K Factor = 4.55
S71	18.42	0.874	1N	7.0	3.667	14.126		K Factor = 4.90
to		150.0	1O	3.0	10.000	-0.181		
401	18.42	0.1798		0.0	13.667	2.458		Vel = 9.85
	0.0							
	18.42					16.403		K Factor = 4.55
400	-19.96	1.394	1N	8.0	131.000	19.388		
to		150.0		0.0	8.000	0.0		
401	-19.96	-0.0215		0.0	139.000	-2.985		Vel = 4.20
401	36.84	1.394	3N	24.0	146.167	16.403		
to		150.0		0.0	24.000	0.0		
402	16.88	0.0158		0.0	170.167	2.681		Vel = 3.55
402	0.0	1.394	1O	6.0	13.333	19.084		
to		150.0		0.0	6.000	0.0		
400	16.88	0.0157		0.0	19.333	0.304		Vel = 3.55
	0.0							
	16.88					19.388		K Factor = 3.83
400	36.83	1.394	1N	8.0	81.500	19.388		
to		150.0		0.0	8.000	0.0		
TOD2	36.83	0.0667		0.0	89.500	5.973		Vel = 7.74
TOD2	0.0	1.61	1E	4.0	5.500	25.361		
to		120.0	1Dvc	3.0	7.000	2.382		
BOD2	36.83	0.0500		0.0	12.500	0.625		Vel = 5.80
BOD2	0.0	1.61	1T	8.0	2.000	28.368		
to		120.0		0.0	8.000	0.0		
BOD1	36.83	0.0500		0.0	10.000	0.500		Vel = 5.80
BOD1	0.0	1.61	1E	4.0	15.084	28.868		
to		120.0		0.0	4.000	6.533		
DPVF	36.83	0.0500		0.0	19.084	0.954		Vel = 5.80
DPVF	0.0	1.61	1T	8.0	13.417	36.355		
to		120.0		0.0	8.000	0.0		
SP2	36.83	0.0500		0.0	21.417	1.071		Vel = 5.80
	0.0							
	36.83					37.426		K Factor = 6.02
S72	0.0	0.874	1O	3.0	9.833	24.956		
to		150.0		0.0	3.000	4.259		
B72	0.0	0.0		0.0	12.833	0.0		Vel = 0
B72	0.0	0.874	1O	3.0	8.750	29.215		
to		150.0		0.0	3.000	0.0		
B76	0.0	0.0		0.0	11.750	0.0		Vel = 0
B76	0.0	0.874	1O	3.0	7.167	29.215		
to		150.0		0.0	3.000	0.0		
307	0.0	0.0		0.0	10.167	0.0		Vel = 0
	0.0							

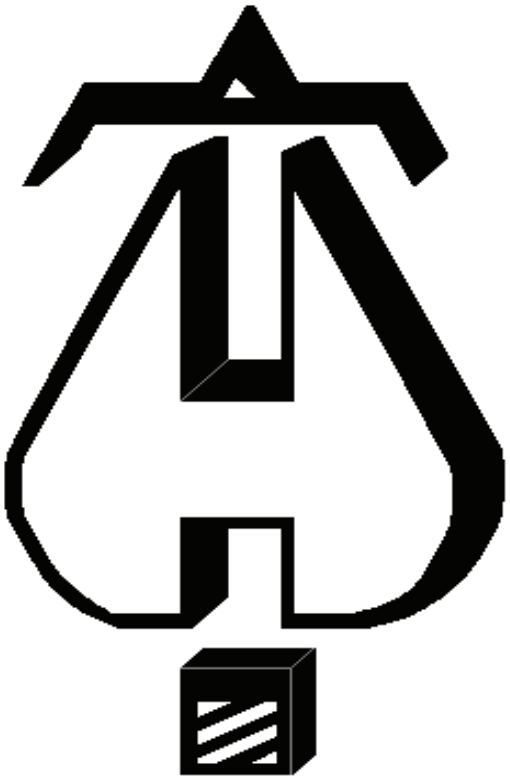
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	0.0					29.215		K Factor = 0
S73	0.0	0.874	3N	21.0	16.000	24.618		
to		150.0	1O	3.0	24.000	4.439		
B73	0.0	0.0		0.0	40.000	0.0		Vel = 0
B73	0.0	0.874	1N	7.0	4.167	29.057		
to		150.0	1O	3.0	10.000	0.0		
303	0.0	0.0		0.0	14.167	0.0		Vel = 0
	0.0							
	0.0					29.057		K Factor = 0
S74	16.05	0.874	1O	3.0	0.167	13.300		K Factor = 4.40
to		150.0		0.0	3.000	0.0		
T74	16.05	0.1392		0.0	3.167	0.441		Vel = 8.58
T74	16.04	0.874	1O	3.0	9.833	13.741		
to		150.0		0.0	3.000	4.259		
B74	32.09	0.5025		0.0	12.833	6.448		Vel = 17.16
B74	0.0	0.874	1O	3.0	6.000	24.448		
to		150.0		0.0	3.000	0.0		
305	32.09	0.5023		0.0	9.000	4.521		Vel = 17.16
	0.0							
	32.09					28.969		K Factor = 5.96
S75	16.05	0.874	1O	3.0	0.167	13.300		K Factor = 4.40
to		150.0		0.0	3.000	0.0		
T74	16.05	0.1392		0.0	3.167	0.441		Vel = 8.58
	0.0							
	16.05					13.741		K Factor = 4.33
S76	0.0	0.874	1O	3.0	9.833	24.956		
to		150.0		0.0	3.000	4.259		
B76	0.0	0.0		0.0	12.833	0.0		Vel = 0
	0.0							
	0.0					29.215		K Factor = 0
S77	0.0	0.874	1O	3.0	0.167	24.765		
to		150.0		0.0	3.000	0.0		
T77	0.0	0.0		0.0	3.167	0.0		Vel = 0
T77	0.0	0.874	1O	3.0	9.833	24.765		
to		150.0		0.0	3.000	4.259		
B77	0.0	0.0		0.0	12.833	0.0		Vel = 0
B77	0.0	0.874	1N	7.0	3.333	29.024		
to		150.0	1O	3.0	10.000	0.0		
306	0.0	0.0		0.0	13.333	0.0		Vel = 0
	0.0							
	0.0					29.024		K Factor = 0
S78	0.0	0.874	1O	3.0	0.167	24.765		
to		150.0		0.0	3.000	0.0		
T77	0.0	0.0		0.0	3.167	0.0		Vel = 0
	0.0							
	0.0					24.765		K Factor = 0
S79	0.0	0.874	1O	3.0	9.833	24.765		
to		150.0		0.0	3.000	4.259		
B79	0.0	0.0		0.0	12.833	0.0		Vel = 0

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
B79	0.0	0.874	1N	7.0	6.250	29.024		
to		150.0	1O	3.0	10.000	0.0		
306	0.0	0.0		0.0	16.250	0.0		Vel = 0
	0.0							
	0.0					29.024		K Factor = 0
S60	0.0	0.874	1O	3.0	9.833	25.075		
to		150.0		0.0	3.000	4.259		
B60	0.0	0.0		0.0	12.833	0.0		Vel = 0
B60	0.0	0.874	2N	14.0	15.750	29.334		
to		150.0	1O	3.0	17.000	13.318		
302A	0.0	0.0		0.0	32.750	-0.001		Vel = 0
	0.0							
	0.0					42.651		K Factor = 0
S61	0.0	0.874	1O	3.0	9.833	24.772		
to		150.0		0.0	3.000	4.259		
B61	0.0	-0.0001		0.0	12.833	-0.001		Vel = 0
B61	0.0	0.874	2N	14.0	7.750	29.030		
to		150.0	1O	3.0	17.000	0.0		
304	0.0	0.0		0.0	24.750	0.0		Vel = 0
	0.0							
	0.0					29.030		K Factor = 0
S62	0.0	0.874	1O	3.0	9.833	25.268		
to		150.0		0.0	3.000	4.259		
B62	0.0	-0.0001		0.0	12.833	-0.001		Vel = 0
B62	0.0	0.874	2N	14.0	9.834	29.526		
to		150.0	1O	3.0	17.000	0.0		
301	0.0	0.0		0.0	26.834	0.0		Vel = 0
	0.0							
	0.0					29.526		K Factor = 0
S63	0.0	0.874	1O	3.0	9.833	24.956		
to		150.0		0.0	3.000	4.259		
B63	0.0	0.0		0.0	12.833	0.0		Vel = 0
B63	0.0	0.874	2N	14.0	9.584	29.215		
to		150.0	1O	3.0	17.000	0.0		
307	0.0	0.0		0.0	26.584	0.0		Vel = 0
	0.0							
	0.0					29.215		K Factor = 0
300	-12.34	1.394	5N	40.0	117.167	30.967		
to		150.0	1O	6.0	46.000	0.0		
301	-12.34	-0.0088		0.0	163.167	-1.441		Vel = 2.59
301	0.0	1.394	1O	6.0	15.833	29.526		
to		150.0		0.0	6.000	0.0		
302	-12.34	-0.0088		0.0	21.833	-0.192		Vel = 2.59
302	0.0	1.394	1N	8.0	23.333	29.334		
to		150.0		0.0	8.000	0.0		
303	-12.34	-0.0088		0.0	31.333	-0.277		Vel = 2.59
303	0.0	1.394		0.0	3.000	29.057		
to		150.0		0.0	0.0	0.0		
304	-12.34	-0.0090		0.0	3.000	-0.027		Vel = 2.59

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
304	0.0	1.394		0.0	6.917	29.030		
to		150.0		0.0	0.0	0.0		
305	-12.34	-0.0088		0.0	6.917	-0.061		Vel = 2.59
305	32.09	1.394		0.0	2.583	28.969		
to		150.0		0.0	0.0	0.0		
306	19.75	0.0213		0.0	2.583	0.055		Vel = 4.15
306	0.0	1.394		0.0	9.083	29.024		
to		150.0		0.0	0.0	0.0		
307	19.75	0.0210		0.0	9.083	0.191		Vel = 4.15
307	0.0	1.394	1O	6.0	77.167	29.215		
to		150.0		0.0	6.000	0.0		
300	19.75	0.0211		0.0	83.167	1.752		Vel = 4.15
	0.0							
	19.75					30.967		K Factor = 3.55
302	0.0	1.394		0.0	4.500	29.334		
to		150.0		0.0	0.0	13.318		
302A	0.0	-0.0002		0.0	4.500	-0.001		Vel = 0
	0.0							
	0.0					42.651		K Factor = 0
300	32.09	1.682	3E	14.849	35.833	30.967		
to		120.0	1Ball	3.094	17.943	0.0		
3RD	32.09	0.0313		0.0	53.776	1.684		Vel = 4.63
3RD	0.0	1.682	1E	4.95	9.917	32.651		
to		120.0		0.0	4.950	4.295		
2ND	32.09	0.0313		0.0	14.867	0.466		Vel = 4.63
2ND	0.0	4.26	1E	13.167	30.167	37.412		
to		120.0	1T	26.334	39.501	0.0		
SP3A	32.09	0.0003		0.0	69.668	0.023		Vel = 0.72
	0.0							
	32.09					37.435		K Factor = 5.24
SP2	36.83	6.357	1E	17.603	16.917	37.426		
to		120.0		0.0	17.603	0.0		
SP3	36.83	0.0001		0.0	34.520	0.002		Vel = 0.37
SP3	0.0	6.357	1T	37.72	77.250	37.428		
to		120.0		0.0	37.720	0.0		
SP3A	36.83	0.0001		0.0	114.970	0.007		Vel = 0.37
SP3A	32.10	6.357	1T	37.72	2.000	37.435		
to		120.0		0.0	37.720	0.0		
SP4	68.93	0.0002		0.0	39.720	0.008		Vel = 0.70
SP4	0.0	6.357	1T	37.72	128.083	37.443		
to		120.0		0.0	37.720	0.0		
SP4X	68.93	0.0002		0.0	165.803	0.033		Vel = 0.70
SP4X	0.0	6.357	2E	35.205	132.417	37.476		
to		120.0	1F	8.801	44.006	0.0		
SP5	68.93	0.0002		0.0	176.423	0.035		Vel = 0.70
SP5	0.0	6.357	1T	37.72	71.750	37.511		
to		120.0		0.0	37.720	0.0		
SP6	68.93	0.0002		0.0	109.470	0.022		Vel = 0.70

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
SP6	0.0	6.357	2E	35.205	25.417	37.533		
to		120.0		0.0	35.205	0.0		
SP7	68.93	0.0002		0.0	60.622	0.012		Vel = 0.70
SP7	0.0	6.357	1E	17.603	10.583	37.545		
to		120.0		0.0	17.603	4.584		
SP8	68.93	0.0002		0.0	28.186	0.005		Vel = 0.70
SP8	0.0	6.357	1E	17.603	11.833	42.134		
to		120.0		0.0	17.603	0.0		
TOS	68.93	0.0002		0.0	29.436	0.006		Vel = 0.70
TOS	0.0	6.357	1T	37.72	5.250	42.140		
to		120.0		0.0	37.720	2.274		
BOS	68.93	0.0002		0.0	42.970	0.008		Vel = 0.70
BOS	0.0	3.26	1Zcb	0.0	4.000	44.422		
to		140.0		0.0	0.0	8.766		* * Fixed Loss = 7.033
FLG	68.93	0.0038		0.0	4.000	0.015		Vel = 2.65
FLG	0.0	8.27	1E	28.468	11.000	53.203		
to		140.0		0.0	28.468	2.599		
CH1	68.93	0.0001		0.0	39.468	0.002		Vel = 0.41
CH1	0.0	7.68	1T	43.857	56.500	55.804		
to		150.0	1B	15.037	58.894	0.0		
UG1	68.93	0.0001		0.0	115.394	0.006		Vel = 0.48
	0.0							
	68.93					55.810		K Factor = 9.23
UG1	-929.99	7.68	4F	45.11	1029.417	55.810		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-929.99	-0.0064		0.0	1118.384	-7.210		Vel = 6.44
UG2	0.0	7.68	1T	43.857	312.417	48.600		
to		150.0		0.0	43.857	0.0		
UG3	-929.99	-0.0064		0.0	356.274	-2.297		Vel = 6.44
UG3	0.0	7.68	1T	43.857	33.117	46.303		
to		150.0	1Zcg	0.0	43.857	8.283		* * Fixed Loss = 8.283
CT1	-929.99	-0.0065		0.0	76.974	-0.497		Vel = 6.44
CT1	0.0	11.2	1T	66.446	456.417	54.089		
to		150.0		0.0	66.446	0.0		
CT2	-929.99	-0.0010		0.0	522.863	-0.537		Vel = 3.03
CT2	-218.93	11.2	1T	66.446	267.583	53.552		
to		150.0		0.0	66.446	0.0		
CT3	-1148.92	-0.0015		0.0	334.029	-0.507		Vel = 3.74
CT3	0.0	5.86	1T	38.342	192.333	53.045		
to		150.0	1F	8.947	47.288	11.290		* * Fixed Loss = 11.29
UG1	-1148.92	-0.0356	1Zcg	0.0	239.621	-8.525		Vel = 13.67
	0.0							
	-1148.92					55.810		K Factor = -153.79
CT2	218.93	6.16	1E	20.084	22.500	53.552		
to		140.0	1G	4.304	67.425	-3.248		
CTY	218.93	0.0015	1T	43.037	89.925	0.133		Vel = 2.36
	0.0							
	218.93					50.437		K Factor = 30.83

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 1 Section B Clubhouse Wet System Remote 8.WXF

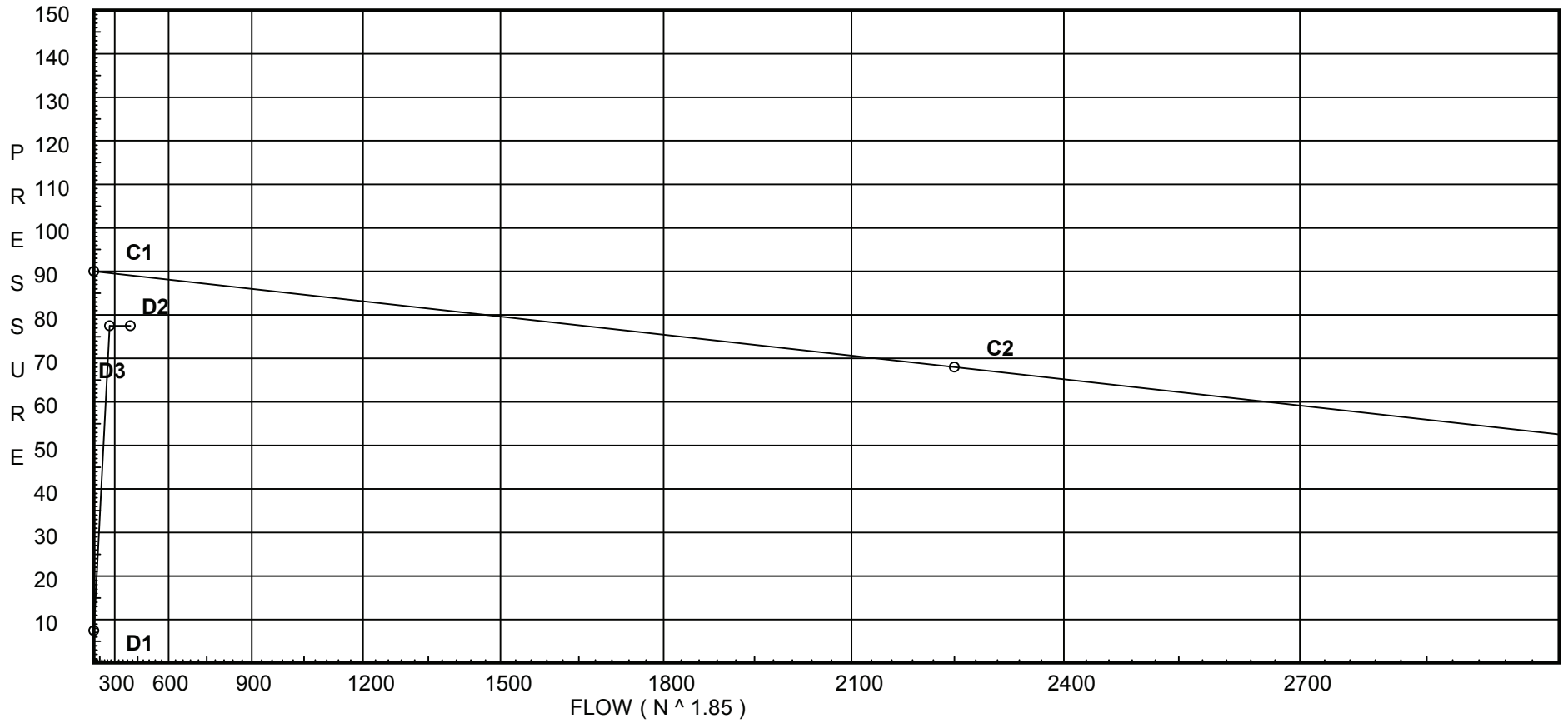
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 7.471
- D2 - System Flow : 257.782
- D2 - System Pressure : 77.501
- Hose (Demand) : 150
- D3 - System Demand : 407.782
- Safety Margin : 11.565



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S90	19.75	5.6	12.32	na	19.66	0.1	146	7.0
T91	20.167		16.12	na				
S91	19.75	5.6	15.44	na	22.01	0.1	148	7.0
S92	19.75	5.6	22.83	na	26.75	0.1	130	7.0
S93	19.75	5.6	24.05	na	27.46	0.1	130	7.0
S94	19.75	5.6	13.53	na	20.6	0.1	206	7.0
T95	20.167		17.35	na				
S95	19.75	5.6	16.62	na	22.83	0.1	199	7.0
S96	19.75	5.6	22.9	na	26.8	0.1	199	7.0
S97	19.75	5.6	14.07	na	21.0	0.1	206	7.0
T98	20.167		17.94	na				
S98	19.75	5.6	17.18	na	23.21	0.1	199	7.0
S99	19.75	5.6	17.6	na	23.49	0.1	45	7.0
T100	20.167		21.65	na				
S100	19.75	5.6	18.32	na	23.97	0.1	130	7.0
200	20.167		38.3	na				
201	20.167		30.8	na				
202	20.167		29.37	na				
203	20.167		28.42	na				
204	20.167		28.33	na				
205	20.167		28.33	na				
2ND	20.167		56.1	na				
SP2	20.833		64.93	na				
SP3	20.833		64.93	na				
SP3A	20.833		64.93	na				
SP4	20.833		65.02	na				
SP5	20.833		65.8	na				
SP6	20.833		66.05	na				
SP7	20.833		66.12	na				
SP8	10.25		70.77	na				
TOS	10.25		70.86	na				
BOS	5.0		73.24	na				
FLG	1.0		78.87	na				
CH1	-5.0		81.49	na				
UG1	-5.0		81.56	na	150.0			
UG2	-5.0		75.0	na				
UG3	-5.0		72.91	na				
CT1	-5.0		80.82	na				
CT2	-5.0		80.33	na				
CT3	-5.0		79.7	na				
CTY	2.5		77.5	na				

The maximum velocity is 25.38 and it occurs in the pipe between nodes T100 and 201

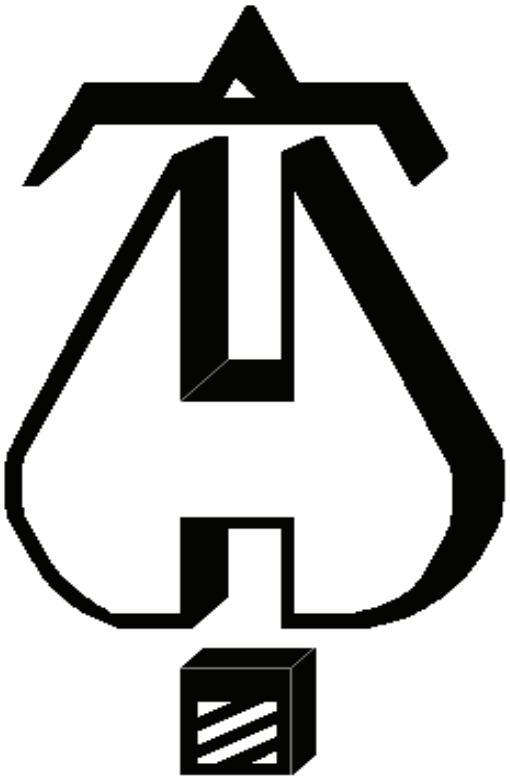
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S90	19.66	0.874	1N	7.0	12.583	12.324		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T91	19.66	0.2029		0.0	19.583	3.974		Vel = 10.51
T91	22.01	0.874	1O	3.0	12.000	16.117		
to		150.0		0.0	3.000	0.0		
205	41.67	0.8143		0.0	15.000	12.215		Vel = 22.28
	0.0							
	41.67					28.332		K Factor = 7.83
S91	22.01	0.874	1O	3.0	0.417	15.444		K Factor = 5.60
to		150.0		0.0	3.000	-0.181		
T91	22.01	0.2499		0.0	3.417	0.854		Vel = 11.77
	0.0							
	22.01					16.117		K Factor = 5.48
S92	26.75	0.874	1N	7.0	5.833	22.825		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
204	26.75	0.3589		0.0	15.833	5.682		Vel = 14.31
	0.0							
	26.75					28.326		K Factor = 5.03
S93	27.46	0.874	2O	6.0	5.834	24.050		K Factor = 5.60
to		150.0		0.0	6.000	-0.181		
204	27.46	0.3766		0.0	11.834	4.457		Vel = 14.68
	0.0							
	27.46					28.326		K Factor = 5.16
S94	20.60	0.874	1N	7.0	11.084	13.532		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T95	20.6	0.2212		0.0	18.084	4.001		Vel = 11.02
T95	22.83	0.874	1O	3.0	9.583	17.352		
to		150.0		0.0	3.000	0.0		
203	43.43	0.8793		0.0	12.583	11.064		Vel = 23.23
	0.0							
	43.43					28.416		K Factor = 8.15
S95	22.83	0.874	1O	3.0	0.417	16.619		K Factor = 5.60
to		150.0		0.0	3.000	-0.181		
T95	22.83	0.2675		0.0	3.417	0.914		Vel = 12.21
	0.0							
	22.83					17.352		K Factor = 5.48
S96	26.80	0.874	1N	7.0	5.834	22.898		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
203	26.8	0.3599		0.0	15.834	5.699		Vel = 14.33
	0.0							
	26.80					28.416		K Factor = 5.03
S97	21.00	0.874	1N	7.0	10.667	14.067		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T98	21.0	0.2294		0.0	17.667	4.052		Vel = 11.23
T98	23.21	0.874	1O	3.0	9.583	17.938		
to		150.0		0.0	3.000	0.0		
202	44.21	0.9088		0.0	12.583	11.435		Vel = 23.64

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									
	44.21					29.373		K Factor = 8.16		
S98	23.21	0.874	1O	3.0	0.417	17.176		K Factor = 5.60		
to		150.0		0.0	3.000	-0.181				
T98	23.21	0.2760		0.0	3.417	0.943		Vel = 12.41		
	0.0									
	23.21					17.938		K Factor = 5.48		
S99	23.49	0.874	1N	7.0	8.000	17.600		K Factor = 5.60		
to		150.0		0.0	7.000	-0.181				
T100	23.49	0.2821		0.0	15.000	4.232		Vel = 12.56		
T100	23.97	0.874	1O	3.0	5.833	21.651				
to		150.0		0.0	3.000	0.0				
201	47.46	1.0361		0.0	8.833	9.152		Vel = 25.38		
	0.0									
	47.46					30.803		K Factor = 8.55		
S100	23.97	0.874	1N	7.0	2.000	18.318		K Factor = 5.60		
to		150.0	1O	3.0	10.000	-0.181				
T100	23.97	0.2928		0.0	12.000	3.514		Vel = 12.82		
	0.0									
	23.97					21.651		K Factor = 5.15		
200	-191.86	2.003		0.0	31.000	38.303				
to		150.0		0.0	0.0	0.0				
201	-191.86	-0.2419		0.0	31.000	-7.500		Vel = 19.53		
201	47.46	2.003		0.0	10.000	30.803				
to		150.0		0.0	0.0	0.0				
202	-144.4	-0.1430		0.0	10.000	-1.430		Vel = 14.70		
202	44.21	2.003		0.0	13.167	29.373				
to		150.0		0.0	0.0	0.0				
203	-100.19	-0.0727		0.0	13.167	-0.957		Vel = 10.20		
203	70.23	2.003		0.0	11.500	28.416				
to		150.0		0.0	0.0	0.0				
204	-29.96	-0.0078		0.0	11.500	-0.090		Vel = 3.05		
204	54.21	2.003		0.0	1.250	28.326				
to		150.0		0.0	0.0	0.0				
205	24.25	0.0048		0.0	1.250	0.006		Vel = 2.47		
205	41.67	2.003	8N	88.0	199.417	28.332				
to		150.0	1O	10.0	98.000	0.0				
200	65.92	0.0335		0.0	297.417	9.971		Vel = 6.71		
	0.0									
	65.92					38.303		K Factor = 10.65		
200	257.78	2.635	3E	24.711	37.167	38.303				
to		120.0	1B	9.61	70.015	0.0				
2ND	257.78	0.1661	1T	16.474	107.182	17.799		Vel = 15.17		
			1S	19.22						
2ND	0.0	2.635	3E	24.711	30.167	56.102				
to		120.0		0.0	24.711	-0.288				
SP3A	257.78	0.1661		0.0	54.878	9.113		Vel = 15.17		
	0.0									

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	257.78					64.927		K Factor = 31.99
SP2	0.0	6.357	1E	17.603	16.917	64.927		
to		120.0		0.0	17.603	0.0		
SP3	0.0	0.0		0.0	34.520	0.0		Vel = 0
SP3	0.0	6.357		0.0	75.250	64.927		
to		120.0		0.0	0.0	0.0		
SP3A	0.0	0.0		0.0	75.250	0.0		Vel = 0
SP3A	257.78	6.357	1T	37.72	1.917	64.927		
to		120.0		0.0	37.720	0.0		
SP4	257.78	0.0023		0.0	39.637	0.090		Vel = 2.61
SP4	0.0	6.357	2E	35.205	260.500	65.017		
to		120.0	1F	8.801	81.726	0.0		
SP5	257.78	0.0023	1T	37.72	342.226	0.780		Vel = 2.61
SP5	0.0	6.357	1T	37.72	71.750	65.797		
to		120.0		0.0	37.720	0.0		
SP6	257.78	0.0023		0.0	109.470	0.249		Vel = 2.61
SP6	0.0	6.357	1E	17.603	16.167	66.046		
to		120.0		0.0	17.603	0.0		
SP7	257.78	0.0023		0.0	33.770	0.077		Vel = 2.61
SP7	0.0	6.357	1E	17.603	10.583	66.123		
to		120.0		0.0	17.603	4.584		
SP8	257.78	0.0023		0.0	28.186	0.064		Vel = 2.61
SP8	0.0	6.357	2E	35.205	5.917	70.771		
to		120.0		0.0	35.205	0.0		
TOS	257.78	0.0023		0.0	41.122	0.094		Vel = 2.61
TOS	0.0	6.357	1T	37.72	5.250	70.865		
to		120.0		0.0	37.720	2.274		
BOS	257.78	0.0023		0.0	42.970	0.097		Vel = 2.61
BOS	0.0	3.26	1Zcb	0.0	4.000	73.236		
to		140.0		0.0	0.0	5.461		* * Fixed Loss = 3.729
FLG	257.78	0.0445		0.0	4.000	0.178		Vel = 9.91
FLG	0.0	8.27	1E	28.468	11.000	78.875		
to		140.0		0.0	28.468	2.599		
CH1	257.78	0.0005		0.0	39.468	0.018		Vel = 1.54
CH1	0.0	7.68	1T	43.857	56.500	81.492		
to		150.0	1B	15.037	58.894	0.0		
UG1	257.78	0.0006		0.0	115.394	0.069		Vel = 1.79
	0.0							
	257.78					81.561		K Factor = 28.54
UG1	-883.63	7.68	4F	45.11	1029.417	81.561		Qa = 150
to		150.0	1T	43.857	88.967	0.0		
UG2	-883.63	-0.0059		0.0	1118.384	-6.559		Vel = 6.12
UG2	0.0	7.68	1T	43.857	312.417	75.002		
to		150.0		0.0	43.857	0.0		
UG3	-883.63	-0.0059		0.0	356.274	-2.089		Vel = 6.12
UG3	0.0	7.68	1T	43.857	33.117	72.913		
to		150.0	1Zcg	0.0	43.857	8.357		* * Fixed Loss = 8.357
CT1	-883.63	-0.0059		0.0	76.974	-0.452		Vel = 6.12

Final Calculations - Hazen-Williams

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
CT1	0.0	11.2	1T	66.446	456.417	80.818		
to		150.0		0.0	66.446	0.0		
CT2	-883.63	-0.0009		0.0	522.863	-0.488		Vel = 2.88
CT2	-407.78	11.2	1T	66.446	267.583	80.330		
to		150.0		0.0	66.446	0.0		
CT3	-1291.41	-0.0019		0.0	334.029	-0.629		Vel = 4.21
CT3	0.0	5.86	1T	38.342	192.333	79.701		
to		150.0	1F	8.947	47.288	12.446		* * Fixed Loss = 12.446
UG1	-1291.41	-0.0442	1Zcg	0.0	239.621	-10.586		Vel = 15.36
	0.0							
	-1291.41					81.561		K Factor = -143.00
CT2	407.78	6.16	1E	20.084	22.500	80.330		
to		140.0	1G	4.304	67.425	-3.248		
CTY	407.78	0.0047	1T	43.037	89.925	0.419		Vel = 4.39
	0.0							
	407.78					77.501		K Factor = 46.32



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name : Summit Square
Building :
Location :
System :
Contract :
Data File : Building 2 Section F Low Pressure Dry System Remote 9.WXF

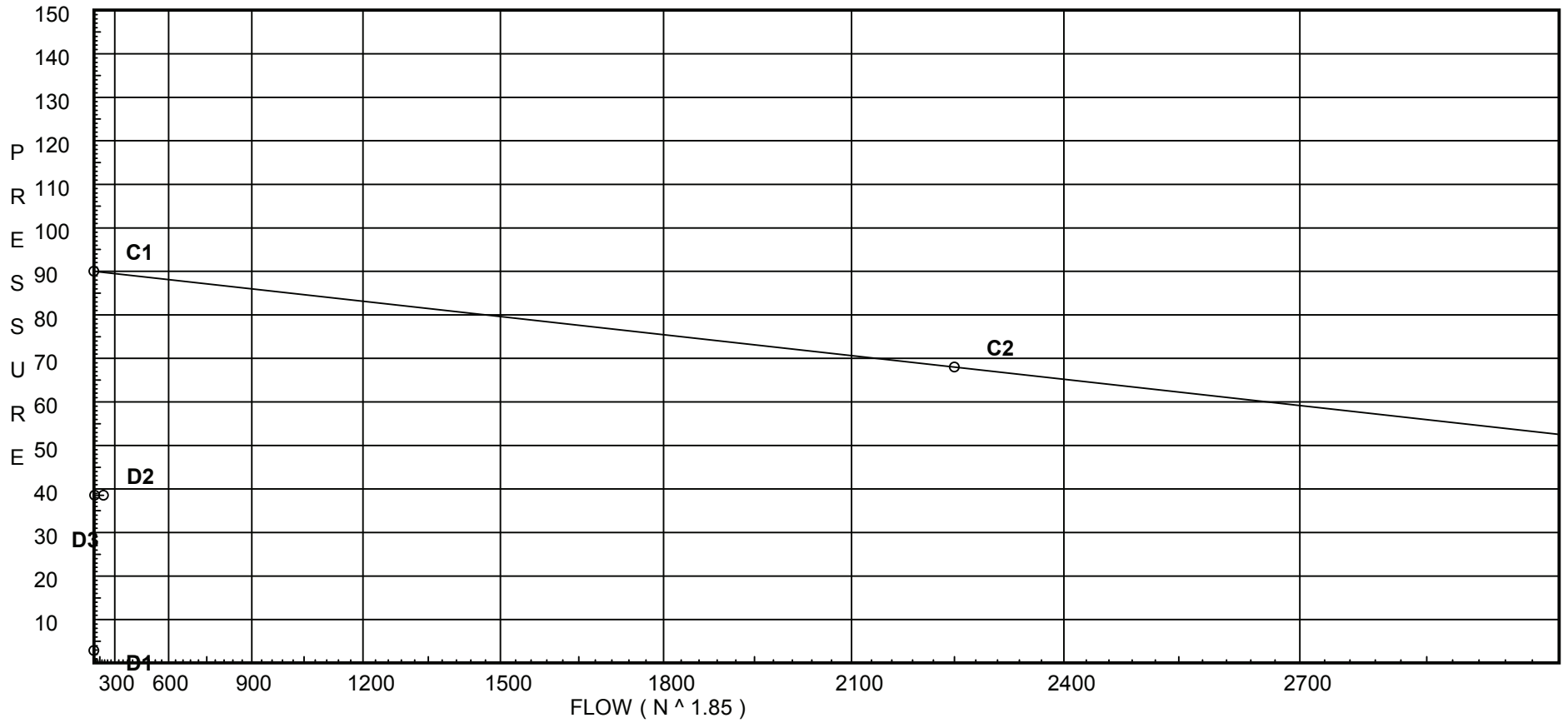
Water Supply Curve C

Ranger Fire Inc
Summit Square

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 2.851
- D2 - System Flow : 49.177
- D2 - System Pressure : 38.559
- Hose (Demand) : 150
- D3 - System Demand : 199.177
- Safety Margin : 51.193



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zaa	Ames 2000B	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S100	9.083	5.6	7.0	na	14.82	0.15	92	7.0
T101	9.5		8.73	na				
S101	9.083	5.6	8.42	na	16.25	0.15	92	7.0
S102	9.083	5.6	10.46	na	18.11	0.15	110	7.0
S110	9.083		14.78	na				
S111	9.083		14.78	na				
S112	9.083		14.9	na				
T113	9.5		14.72	na				
S113	9.083		14.9	na				
100	9.5		16.71	na				
101	9.5		12.12	na				
102	9.5		14.59	na				
103	9.5		14.72	na				
TOD4	9.5		19.47	na				
BOD4	4.0		22.8	na				
DPVF	20.833		17.99	na				
SPX	20.833		19.02	na				
SPX1	20.833		19.04	na				
SP13	20.833		19.05	na				
SP14	20.833		19.05	na				
SP15	10.25		23.64	na				
TOS	10.25		23.64	na				
BOS	5.0		25.92	na				
FLG	1.0		33.41	na				
CH2	-5.0		36.01	na				
UG1	-5.0		44.64	na				
UG2	-5.0		36.01	na	150.0			
UG3	-5.0		34.17	na				
CT1	-5.0		42.13	na				
CT2	-5.0		41.7	na				
CT3	-5.0		41.29	na				
CTY	2.5		38.56	na				

The maximum velocity is 16.62 and it occurs in the pipe between nodes T101 and 101

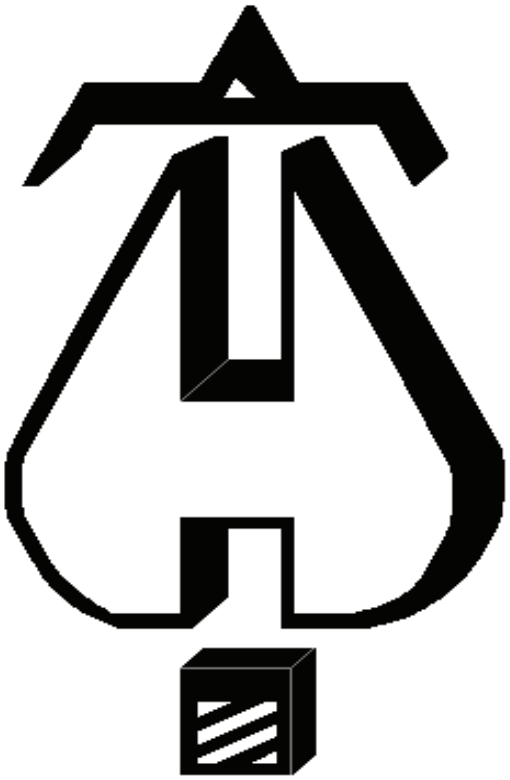
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S100	14.82	0.874	1N	7.0	8.888	7.000		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T101	14.82	0.1203		0.0	15.888	1.911		Vel = 7.93
T101	16.25	0.874	1O	3.0	4.167	8.730		
to		150.0		0.0	3.000	0.0		
101	31.07	0.4731		0.0	7.167	3.391		Vel = 16.62
	0.0							
	31.07					12.121		K Factor = 8.92
S101	16.25	0.874	1O	3.0	0.417	8.423		K Factor = 5.60
to		150.0		0.0	3.000	-0.181		
T101	16.25	0.1428		0.0	3.417	0.488		Vel = 8.69
	0.0							
	16.25					8.730		K Factor = 5.50
S102	18.11	0.874	2O	6.0	4.584	10.457		K Factor = 5.60
to		150.0		0.0	6.000	-0.181		
101	18.11	0.1743		0.0	10.584	1.845		Vel = 9.68
	0.0							
	18.11					12.121		K Factor = 5.20
S110	0.0	0.874	1N	7.0	11.917	14.775		
to		150.0	1O	3.0	10.000	-0.181		
102	0.0	0.0		0.0	21.917	0.001		Vel = 0
	0.0							
	0.0					14.595		K Factor = 0
S111	0.0	0.874	1N	7.0	2.167	14.775		
to		150.0	1O	3.0	10.000	-0.181		
102	0.0	0.0001		0.0	12.167	0.001		Vel = 0
	0.0							
	0.0					14.595		K Factor = 0
S112	0.0	0.874	1N	7.0	5.000	14.900		
to		150.0		0.0	7.000	-0.181		
T113	0.0	0.0		0.0	12.000	0.0		Vel = 0
T113	0.0	0.874	1O	3.0	6.833	14.719		
to		150.0		0.0	3.000	0.0		
103	0.0	0.0		0.0	9.833	0.0		Vel = 0
	0.0							
	0.0					14.719		K Factor = 0
S113	0.0	0.874	1N	7.0	9.167	14.900		
to		150.0	1O	3.0	10.000	-0.181		
T113	0.0	0.0		0.0	19.167	0.0		Vel = 0
	0.0							
	0.0					14.719		K Factor = 0
100	-24.99	1.598	3N	27.0	246.833	16.707		
to		150.0		0.0	27.000	0.0		
101	-24.99	-0.0167		0.0	273.833	-4.586		Vel = 4.00
101	49.17	1.598	4N	36.0	121.000	12.121		
to		150.0		0.0	36.000	0.0		
102	24.18	0.0158		0.0	157.000	2.474		Vel = 3.87

Final Calculations - Hazen-Williams

Ranger Fire Inc
Summit Square

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
102	0.0	1.598		0.0	7.917	14.595		
to		150.0		0.0	0.0	0.0		
103	24.18	0.0157		0.0	7.917	0.124		Vel = 3.87
103	0.0	1.598	1N	9.0	109.167	14.719		
to		150.0	1O	8.0	17.000	0.0		
100	24.18	0.0158		0.0	126.167	1.988		Vel = 3.87
	0.0							
	24.18					16.707		K Factor = 5.92
100	49.18	1.598	1N	9.0	38.250	16.707		
to		150.0		0.0	9.000	0.0		
TOD4	49.18	0.0586		0.0	47.250	2.768		Vel = 7.87
TOD4	0.0	1.61	1Dvc	3.0	5.500	19.475		
to		120.0	1Ball	2.5	5.500	2.382		
BOD4	49.18	0.0854		0.0	11.000	0.939		Vel = 7.75
BOD4	0.0	1.61	2E	8.0	21.083	22.796		
to		120.0		0.0	8.000	-7.290		
DPVF	49.18	0.0853		0.0	29.083	2.481		Vel = 7.75
DPVF	0.0	1.61	1T	8.0	4.083	17.987		
to		120.0		0.0	8.000	0.0		
SPX	49.18	0.0854		0.0	12.083	1.032		Vel = 7.75
	0.0							
	49.18					19.019		K Factor = 11.28
SPX	49.18	6.357	1E	17.603	120.333	19.019		
to		120.0	1T	37.72	55.323	0.0		
SPX1	49.18	0.0001		0.0	175.656	0.018		Vel = 0.50
SPX1	0.0	6.357	1E	17.603	29.917	19.037		
to		120.0	1T	37.72	55.323	0.0		
SP13	49.18	0.0001		0.0	85.240	0.009		Vel = 0.50
SP13	0.0	6.357	2E	35.205	33.500	19.046		
to		120.0		0.0	35.205	0.0		
SP14	49.18	0.0001		0.0	68.705	0.008		Vel = 0.50
SP14	0.0	6.357	1E	17.603	10.583	19.054		
to		120.0		0.0	17.603	4.584		
SP15	49.18	0.0001		0.0	28.186	0.002		Vel = 0.50
SP15	0.0	6.357	2E	35.205	7.583	23.640		
to		120.0		0.0	35.205	0.0		
TOS	49.18	0.0001		0.0	42.788	0.005		Vel = 0.50
TOS	0.0	6.357	1T	37.72	5.250	23.645		
to		120.0	1B	12.573	50.293	2.274		
BOS	49.18	0.0001		0.0	55.543	0.005		Vel = 0.50
BOS	0.0	2.157	1Zaa	0.0	4.000	25.924		
to		120.0		0.0	0.0	7.404		* * Fixed Loss = 5.672
FLG	49.18	0.0208		0.0	4.000	0.083		Vel = 4.32
FLG	0.0	8.27	1E	28.468	11.000	33.411		
to		140.0		0.0	28.468	2.599		
CH2	49.18	0.0		0.0	39.468	0.0		Vel = 0.29
CH2	0.0	7.68	1T	43.857	36.167	36.010		
to		150.0		0.0	43.857	0.0		
UG2	49.18	0.0		0.0	80.024	0.003		Vel = 0.34

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							
	49.18					36.013		K Factor = 8.20
UG1	-1024.64	7.68	4F	45.11	1029.417	44.639		
to		150.0	1T	43.857	88.967	0.0		
UG2	-1024.64	-0.0077		0.0	1118.384	-8.626		Vel = 7.10
UG2	199.17	7.68	1T	43.857	312.417	36.013		Qa = 150
to		150.0		0.0	43.857	0.0		
UG3	-825.47	-0.0052		0.0	356.274	-1.843		Vel = 5.72
UG3	0.0	7.68	1T	43.857	33.117	34.170		
to		150.0	1Zcg	0.0	43.857	8.353		* * Fixed Loss = 8.353
CT1	-825.47	-0.0052		0.0	76.974	-0.397		Vel = 5.72
CT1	0.0	11.2	1T	66.446	456.417	42.126		
to		150.0		0.0	66.446	0.0		
CT2	-825.47	-0.0008		0.0	522.863	-0.431		Vel = 2.69
CT2	-199.17	11.2	1T	66.446	267.583	41.695		
to		150.0		0.0	66.446	0.0		
CT3	-1024.64	-0.0012		0.0	334.029	-0.410		Vel = 3.34
CT3	0.0	5.86	1T	38.342	192.333	41.285		
to		150.0	1F	8.947	47.288	10.253		* * Fixed Loss = 10.253
UG1	-1024.64	-0.0288	1Zcg	0.0	239.621	-6.899		Vel = 12.19
	0.0							
	-1024.64					44.639		K Factor = -153.36
CT2	199.18	6.16	1E	20.084	22.500	41.695		
to		140.0	1G	4.304	67.425	-3.248		
CTY	199.18	0.0012	1T	43.037	89.925	0.112		Vel = 2.14
	0.0							
	199.18					38.559		K Factor = 32.08



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 2 Section F Low Pressure Dry System Remote 10.WXF

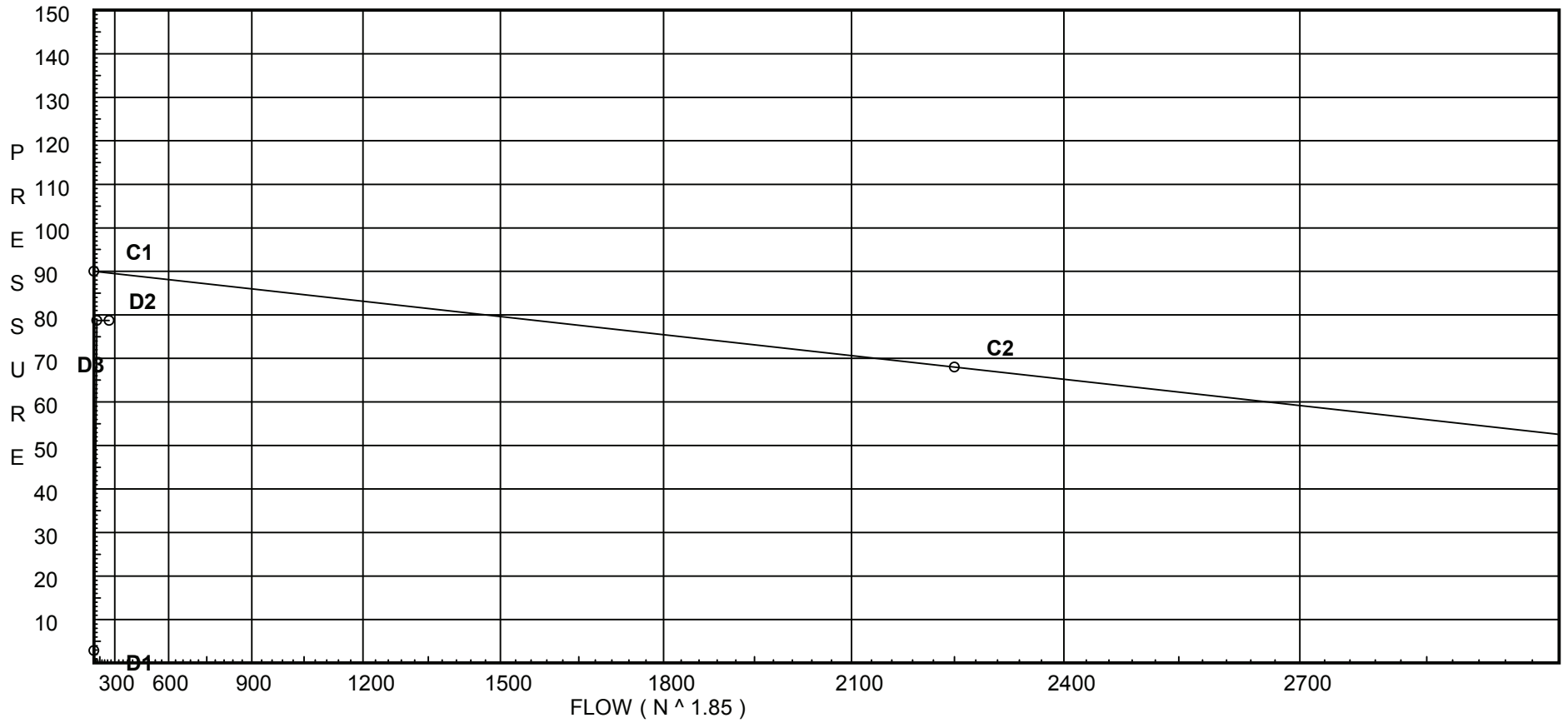
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 2.851
- D2 - System Flow : 104.871
- D2 - System Pressure : 78.701
- Hose (Demand) : 150
- D3 - System Demand : 254.871
- Safety Margin : 10.908



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zaa	Ames 2000B	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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.

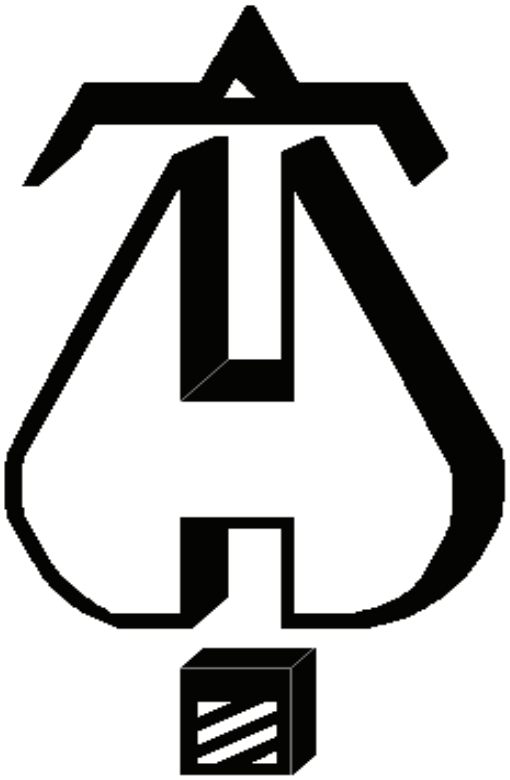
Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S100	9.083		25.08	na				
T101	9.5		24.9	na				
S101	9.083		25.08	na				
S102	9.083		25.08	na				
S110	9.083	5.6	14.75	na	21.51	0.15	104	7.0
S111	9.083	5.6	16.73	na	22.91	0.15	104	7.0
S112	9.083	5.6	11.37	na	18.89	0.15	116	7.0
T113	9.5		13.45	na				
S113	9.083	5.6	10.33	na	18.0	0.15	120	7.0
S114	9.083	5.6	17.71	na	23.57	0.15	95	7.0
100	9.5		33.75	na				
101	9.5		24.9	na				
102	9.5		19.83	na				
103	9.5		19.85	na				
TOD4	9.5		44.99	na				
BOD4	4.0		51.18	na				
DPVF	20.833		53.97	na				
SPX	20.833		58.15	na				
SPX1	20.833		58.23	na				
SP13	20.833		58.26	na				
SP14	20.833		58.29	na				
SP15	10.25		62.89	na				
TOS	10.25		62.91	na				
BOS	5.0		65.21	na				
FLG	1.0		73.19	na				
CH2	-5.0		75.79	na				
UG1	-5.0		84.64	na				
UG2	-5.0		75.8	na	150.0			
UG3	-5.0		74.13	na				
CT1	-5.0		82.16	na				
CT2	-5.0		81.77	na				
CT3	-5.0		81.35	na				
CTY	2.5		78.7	na				

The maximum velocity is 19.73 and it occurs in the pipe between nodes T113 and 103

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S100	0.0	0.874	1N	7.0	8.888	25.082		
to		150.0		0.0	7.000	-0.181		
T101	0.0	0.0001		0.0	15.888	0.001		Vel = 0
T101	0.0	0.874	1O	3.0	4.167	24.902		
to		150.0		0.0	3.000	0.0		
101	0.0	0.0		0.0	7.167	0.0		Vel = 0
	0.0							
	0.0					24.902		K Factor = 0
S101	0.0	0.874	1O	3.0	0.417	25.082		
to		150.0		0.0	3.000	-0.181		
T101	0.0	0.0003		0.0	3.417	0.001		Vel = 0
	0.0							
	0.0					24.902		K Factor = 0
S102	0.0	0.874	2O	6.0	4.584	25.082		
to		150.0		0.0	6.000	-0.181		
101	0.0	0.0001		0.0	10.584	0.001		Vel = 0
	0.0							
	0.0					24.902		K Factor = 0
S110	21.51	0.874	1N	7.0	11.917	14.755		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
102	21.51	0.2397		0.0	21.917	5.253		Vel = 11.50
	0.0							
	21.51					19.827		K Factor = 4.83
S111	22.91	0.874	1N	7.0	2.167	16.732		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
102	22.91	0.2693		0.0	12.167	3.276		Vel = 12.25
	0.0							
	22.91					19.827		K Factor = 5.15
S112	18.89	0.874	1N	7.0	5.000	11.375		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T113	18.89	0.1884		0.0	12.000	2.261		Vel = 10.10
T113	18.00	0.874	1O	3.0	6.833	13.455		
to		150.0		0.0	3.000	0.0		
103	36.89	0.6500		0.0	9.833	6.391		Vel = 19.73
	0.0							
	36.89					19.846		K Factor = 8.28
S113	18.00	0.874	1N	7.0	9.167	10.332		K Factor = 5.60
to		150.0	1O	3.0	10.000	-0.181		
T113	18.0	0.1724		0.0	19.167	3.304		Vel = 9.63
	0.0							
	18.00					13.455		K Factor = 4.91
S114	23.57	0.874	2O	6.0	2.167	17.710		K Factor = 5.60
to		150.0		0.0	6.000	-0.181		
103	23.57	0.2837		0.0	8.167	2.317		Vel = 12.60
	0.0							
	23.57					19.846		K Factor = 5.29
100	-35.66	1.598	3N	27.0	246.833	33.753		
to		150.0		0.0	27.000	0.0		
101	-35.66	-0.0323		0.0	273.833	-8.851		Vel = 5.70

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
101	0.0	1.598	4N	36.0	121.000	24.902		
to		150.0		0.0	36.000	0.0		
102	-35.66	-0.0323		0.0	157.000	-5.075		Vel = 5.70
102	44.42	1.598		0.0	7.917	19.827		
to		150.0		0.0	0.0	0.0		
103	8.76	0.0024		0.0	7.917	0.019		Vel = 1.40
103	60.45	1.598	1N	9.0	109.167	19.846		
to		150.0	1O	8.0	17.000	0.0		
100	69.21	0.1102		0.0	126.167	13.907		Vel = 11.07
	0.0							
	69.21					33.753		K Factor = 11.91
100	104.87	1.598	1N	9.0	38.250	33.753		
to		150.0		0.0	9.000	0.0		
TOD4	104.87	0.2378		0.0	47.250	11.234		Vel = 16.78
TOD4	0.0	1.61	1Dvc	3.0	5.500	44.987		
to		120.0	1Ball	2.5	5.500	2.382		
BOD4	104.87	0.3465		0.0	11.000	3.811		Vel = 16.53
BOD4	0.0	1.61	2E	8.0	21.083	51.180		
to		120.0		0.0	8.000	-7.290		
DPVF	104.87	0.3464		0.0	29.083	10.075		Vel = 16.53
DPVF	0.0	1.61	1T	8.0	4.083	53.965		
to		120.0		0.0	8.000	0.0		
SPX	104.87	0.3464		0.0	12.083	4.186		Vel = 16.53
	0.0							
	104.87					58.151		K Factor = 13.75
SPX	104.87	6.357	1E	17.603	120.333	58.151		
to		120.0	1T	37.72	55.323	0.0		
SPX1	104.87	0.0004		0.0	175.656	0.076		Vel = 1.06
SPX1	0.0	6.357	1E	17.603	29.917	58.227		
to		120.0	1T	37.72	55.323	0.0		
SP13	104.87	0.0004		0.0	85.240	0.037		Vel = 1.06
SP13	0.0	6.357	2E	35.205	33.500	58.264		
to		120.0		0.0	35.205	0.0		
SP14	104.87	0.0004		0.0	68.705	0.029		Vel = 1.06
SP14	0.0	6.357	1E	17.603	10.583	58.293		
to		120.0		0.0	17.603	4.584		
SP15	104.87	0.0004		0.0	28.186	0.012		Vel = 1.06
SP15	0.0	6.357	2E	35.205	7.583	62.889		
to		120.0		0.0	35.205	0.0		
TOS	104.87	0.0004		0.0	42.788	0.018		Vel = 1.06
TOS	0.0	6.357	1T	37.72	5.250	62.907		
to		120.0	1B	12.573	50.293	2.274		
BOS	104.87	0.0004		0.0	55.543	0.024		Vel = 1.06
BOS	0.0	2.157	1Zaa	0.0	4.000	65.205		
to		120.0		0.0	0.0	7.652		* * Fixed Loss = 5.92
FLG	104.87	0.0835		0.0	4.000	0.334		Vel = 9.21
FLG	0.0	8.27	1E	28.468	11.000	73.191		
to		140.0		0.0	28.468	2.599		
CH2	104.87	0.0001		0.0	39.468	0.003		Vel = 0.63

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
CH2	0.0	7.68	1T	43.857	36.167	75.793		
to		150.0		0.0	43.857	0.0		
UG2	104.87	0.0001		0.0	80.024	0.009		Vel = 0.73
	0.0							
	104.87					75.802		K Factor = 12.05
UG1	-1038.31	7.68	4F	45.11	1029.417	84.642		
to		150.0	1T	43.857	88.967	0.0		
UG2	-1038.31	-0.0079		0.0	1118.384	-8.840		Vel = 7.19
UG2	254.87	7.68	1T	43.857	312.417	75.802		Qa = 150
to		150.0		0.0	43.857	0.0		
UG3	-783.44	-0.0047		0.0	356.274	-1.672		Vel = 5.43
UG3	0.0	7.68	1T	43.857	33.117	74.130		
to		150.0	1Zcg	0.0	43.857	8.396		* * Fixed Loss = 8.396
CT1	-783.44	-0.0047		0.0	76.974	-0.362		Vel = 5.43
CT1	0.0	11.2	1T	66.446	456.417	82.164		
to		150.0		0.0	66.446	0.0		
CT2	-783.44	-0.0007		0.0	522.863	-0.391		Vel = 2.55
CT2	-254.87	11.2	1T	66.446	267.583	81.773		
to		150.0		0.0	66.446	0.0		
CT3	-1038.31	-0.0013		0.0	334.029	-0.420		Vel = 3.38
CT3	0.0	5.86	1T	38.342	192.333	81.353		
to		150.0	1F	8.947	47.288	10.360		* * Fixed Loss = 10.36
UG1	-1038.31	-0.0295	1Zcg	0.0	239.621	-7.071		Vel = 12.35
	0.0							
	-1038.31					84.642		K Factor = -112.86
CT2	254.87	6.16	1E	20.084	22.500	81.773		
to		140.0	1G	4.304	67.425	-3.248		
CTY	254.87	0.0020	1T	43.037	89.925	0.176		Vel = 2.74
	0.0							
	254.87					78.701		K Factor = 28.73



. . . Fire Protection by Computer Design

Ranger Fire Inc
1260 Eastex Freeway
Houston,TX 77039

Job Name	:	Summit Square III
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	Building 2 Section G Remote 11.WXF

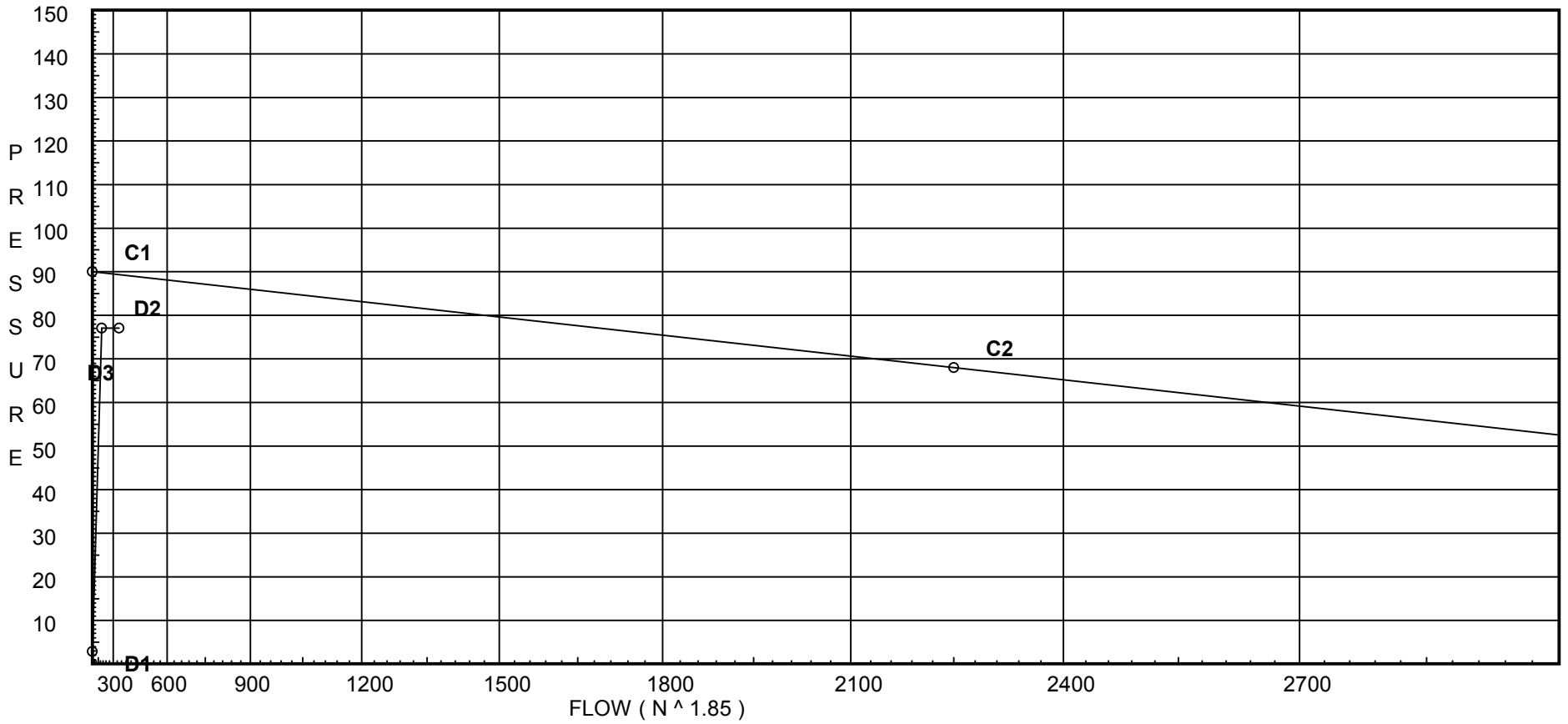
Water Supply Curve C

Ranger Fire Inc
Summit Square III

Date

City Water Supply:
- C1 - Static Pressure : 90
- C2 - Residual Pressure: 68
- C2 - Residual Flow : 2250

Demand:
- D1 - Elevation : 2.851
- D2 - System Flow : 193.703
- D2 - System Pressure : 77.043
- Hose (Demand) : 150
- D3 - System Demand : 343.703
- Safety Margin : 12.277



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'Ell Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Zaa	Ames 2000B	Fitting generates a Fixed Loss Based on Flow																			
Zcg	Colt C400 Horz OSY	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S200	9.083	5.6	17.25	na	23.26	0.15	117	7.0
B200	20.167		22.54	na				
S201	9.083	5.6	13.61	na	20.66	0.15	130	7.0
B201	20.167		19.39	na				
S202	9.083	5.6	16.71	na	22.89	0.15	130	7.0
B202	20.167		21.73	na				
S203	9.083	5.6	10.68	na	18.3	0.15	122	7.0
T204	9.5		14.08	na				
B204	20.167		18.04	na				
S204	9.083	5.6	13.51	na	20.58	0.15	122	7.0
S205	9.083	5.6	28.6	na	29.95	0.15	120	7.0
B205	20.167		28.69	na				
S206	9.083	5.6	13.74	na	20.76	0.15	127	7.0
B206	20.167		14.9	na				
S207	9.083	5.6	9.98	na	17.69	0.15	105	7.0
T208	9.5		12.79	na				
B208	20.167		16.1	na				
S208	9.083	5.6	12.28	na	19.62	0.15	127	7.0
200	20.167		55.85	na				
201	20.167		30.5	na				
202	20.167		25.27	na				
202A	20.167		23.19	na				
203	20.167		23.13	na				
203A	20.167		23.09	na				
204	20.167		23.1	na				
205	20.167		23.64	na				
2ND	20.167		57.85	na				
SPX	20.833		61.81	na				
SPX1	20.833		61.81	na				
SP13	20.833		61.92	na				
SP14	20.833		62.02	na				
SP15	10.25		66.64	na				
TOS	10.25		66.69	na				
BOS	5.0		69.03	na				
FLG	1.0		79.45	na				
CH1	-5.0		82.06	na				
UG1	-5.0		82.1	na				
UG2	-5.0		74.26	na	150.0			
UG3	-5.0		72.42	na				
CT1	-5.0		80.41	na				
CT2	-5.0		79.99	na				
CT3	-5.0		79.46	na				
CTY	2.5		77.04	na				

The maximum velocity is 17.01 and it occurs in the pipe between nodes BOS and FLG

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S200	23.26	0.874	3N	21.0	15.417	17.251		K Factor = 5.60
to		150.0		0.0	21.000	-4.800		
B200	23.26	0.2769		0.0	36.417	10.085		Vel = 12.44
B200	0.0	0.874	1O	3.0	1.000	22.536		
to		150.0		0.0	3.000	0.0		
205	23.26	0.2770		0.0	4.000	1.108		Vel = 12.44
	0.0							
	23.26					23.644		K Factor = 4.78
S201	20.66	0.874	4N	28.0	19.584	13.606		K Factor = 5.60
to		150.0		0.0	28.000	-4.800		
B201	20.66	0.2223		0.0	47.584	10.580		Vel = 11.05
B201	0.0	0.874	1N	7.0	6.833	19.386		
to		150.0	1O	3.0	10.000	0.0		
203	20.66	0.2224		0.0	16.833	3.743		Vel = 11.05
	0.0							
	20.66					23.129		K Factor = 4.30
S202	22.89	0.874	3N	21.0	15.501	16.714		K Factor = 5.60
to		150.0		0.0	21.000	-4.800		
B202	22.89	0.2690		0.0	36.501	9.818		Vel = 12.24
B202	0.0	0.874	1N	7.0	3.167	21.732		
to		150.0	1O	3.0	10.000	0.0		
202	22.89	0.2689		0.0	13.167	3.541		Vel = 12.24
	0.0							
	22.89					25.273		K Factor = 4.55
S203	18.30	0.874	1N	7.0	13.167	10.679		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T204	18.3	0.1777		0.0	20.167	3.584		Vel = 9.79
T204	20.58	1.101	3N	21.0	15.834	14.082		
to		150.0		0.0	21.000	-4.620		
B204	38.88	0.2328		0.0	36.834	8.574		Vel = 13.10
B204	0.0	1.101	2O	10.0	11.750	18.036		
to		150.0		0.0	10.000	0.0		
204	38.88	0.2327		0.0	21.750	5.062		Vel = 13.10
	0.0							
	38.88					23.098		K Factor = 8.09
S204	20.58	0.874	1O	3.0	0.417	13.508		K Factor = 5.60
to		150.0		0.0	3.000	-0.181		
T204	20.58	0.2210		0.0	3.417	0.755		Vel = 11.01
	0.0							
	20.58					14.082		K Factor = 5.48
S205	29.95	0.874		0.0	11.084	28.595		K Factor = 5.60
to		150.0		0.0	0.0	-4.800		
B205	29.95	0.4420		0.0	11.084	4.899		Vel = 16.02
B205	0.0	0.874	1O	3.0	1.083	28.694		
to		150.0		0.0	3.000	0.0		
201	29.95	0.4421		0.0	4.083	1.805		Vel = 16.02
	0.0							
	29.95					30.499		K Factor = 5.42

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
S206	20.76	0.874	3N	21.0	5.584	13.739		K Factor = 5.60
to		150.0		0.0	21.000	-4.800		
B206	20.76	0.2244		0.0	26.584	5.965		Vel = 11.10
B206	0.0	0.874	1N	7.0	26.500	14.904		
to		150.0	1O	3.0	10.000	0.0		
203A	20.76	0.2244		0.0	36.500	8.189		Vel = 11.10
	0.0							
	20.76					23.093		K Factor = 4.32
S207	17.69	0.874	1N	7.0	10.917	9.976		K Factor = 5.60
to		150.0		0.0	7.000	-0.181		
T208	17.69	0.1669		0.0	17.917	2.990		Vel = 9.46
T208	19.62	1.101	3N	21.0	15.784	12.785		
to		150.0		0.0	21.000	-4.620		
B208	37.31	0.2156		0.0	36.784	7.932		Vel = 12.57
B208	0.0	1.101	1N	7.0	20.917	16.097		
to		150.0	1O	5.0	12.000	0.0		
202A	37.31	0.2156		0.0	32.917	7.097		Vel = 12.57
	0.0							
	37.31					23.194		K Factor = 7.75
S208	19.62	0.874	1O	3.0	0.417	12.275		K Factor = 5.60
to		150.0		0.0	3.000	-0.181		
T208	19.62	0.2022		0.0	3.417	0.691		Vel = 10.49
	0.0							
	19.62					12.785		K Factor = 5.49
200	-126.04	2.003	3N	33.0	189.750	55.847		
to		150.0	2F	5.186	38.186	0.0		
201	-126.04	-0.1112		0.0	227.936	-25.348		Vel = 12.83
201	29.94	1.598	2N	18.0	7.834	30.499		
to		150.0		0.0	18.000	0.0		
202	-96.1	-0.2023		0.0	25.834	-5.226		Vel = 15.37
202	22.90	1.598		0.0	17.000	25.273		
to		150.0		0.0	0.0	0.0		
202A	-73.2	-0.1223		0.0	17.000	-2.079		Vel = 11.71
202A	37.31	1.598		0.0	2.000	23.194		
to		150.0		0.0	0.0	0.0		
203	-35.89	-0.0325		0.0	2.000	-0.065		Vel = 5.74
203	20.65	1.598		0.0	5.333	23.129		
to		150.0		0.0	0.0	0.0		
203A	-15.24	-0.0068		0.0	5.333	-0.036		Vel = 2.44
203A	20.76	1.598		0.0	4.833	23.093		
to		150.0		0.0	0.0	0.0		
204	5.52	0.0010		0.0	4.833	0.005		Vel = 0.88
204	38.88	1.598	1N	9.0	2.250	23.098		
to		150.0		0.0	9.000	0.0		
205	44.4	0.0485		0.0	11.250	0.546		Vel = 7.10
205	23.26	1.598	6N	54.0	242.667	23.644		
to		150.0	1O	8.0	62.000	0.0		
200	67.66	0.1057		0.0	304.667	32.203		Vel = 10.82

Final Calculations - Hazen-Williams

Ranger Fire Inc
Summit Square III

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							
	67.66					55.847		K Factor = 9.05
200	193.70	3.26	2E	18.815	38.749	55.847		
to		120.0		0.0	18.815	0.0		
2ND	193.7	0.0347		0.0	57.564	1.998		Vel = 7.45
2ND	0.0	3.26	3E	28.223	39.167	57.845		
to		120.0	1T	20.159	83.325	-0.288		
SPX1	193.7	0.0347	1B	13.44	122.492	4.252		Vel = 7.45
			1S	21.503				
	0.0							
	193.70					61.809		K Factor = 24.64
SPX	0.0	6.357	1E	17.603	120.333	61.809		
to		120.0	1T	37.72	55.323	0.0		
SPX1	0.0	0.0		0.0	175.656	0.0		Vel = 0
SPX1	193.70	6.357	1E	17.603	29.917	61.809		
to		120.0	1T	37.72	55.323	0.0		
SP13	193.7	0.0013		0.0	85.240	0.114		Vel = 1.96
SP13	0.0	6.357	2E	35.205	33.500	61.923		
to		120.0		0.0	35.205	0.0		
SP14	193.7	0.0014		0.0	68.705	0.093		Vel = 1.96
SP14	0.0	6.357	1E	17.603	10.583	62.016		
to		120.0		0.0	17.603	4.584		
SP15	193.7	0.0013		0.0	28.186	0.037		Vel = 1.96
SP15	0.0	6.357	2E	35.205	7.583	66.637		
to		120.0		0.0	35.205	0.0		
TOS	193.7	0.0013		0.0	42.788	0.057		Vel = 1.96
TOS	0.0	6.357	1T	37.72	5.250	66.694		
to		120.0		0.0	37.720	2.274		
BOS	193.7	0.0013		0.0	42.970	0.058		Vel = 1.96
BOS	0.0	2.157	1Zaa	0.0	4.000	69.026		
to		120.0		0.0	0.0	9.390		* * Fixed Loss = 7.657
FLG	193.7	0.2592		0.0	4.000	1.037		Vel = 17.01
FLG	0.0	8.27	1E	28.468	11.000	79.453		
to		140.0		0.0	28.468	2.599		
CH1	193.7	0.0003		0.0	39.468	0.011		Vel = 1.16
CH1	0.0	7.68	1T	43.857	56.500	82.063		
to		150.0	1B	15.037	58.894	0.0		
UG1	193.7	0.0004		0.0	115.394	0.041		Vel = 1.34
	0.0							
	193.70					82.104		K Factor = 21.38
UG1	-973.47	7.68	4F	45.11	1029.417	82.104		
to		150.0	1T	43.857	88.967	0.0		
UG2	-973.47	-0.0070		0.0	1118.384	-7.846		Vel = 6.74
UG2	150.00	7.68	1T	43.857	312.417	74.258		Qa = 150
to		150.0		0.0	43.857	0.0		
UG3	-823.47	-0.0051		0.0	356.274	-1.834		Vel = 5.70
UG3	0.0	7.68	1T	43.857	33.117	72.424		
to		150.0	1Zcg	0.0	43.857	8.386		* * Fixed Loss = 8.386
CT1	-823.47	-0.0051		0.0	76.974	-0.396		Vel = 5.70

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
CT1	0.0	11.2	1T	66.446	456.417	80.414		
to		150.0		0.0	66.446	0.0		
CT2	-823.47	-0.0008		0.0	522.863	-0.429		Vel = 2.68
CT2	-343.70	11.2	1T	66.446	267.583	79.985		
to		150.0		0.0	66.446	0.0		
CT3	-1167.17	-0.0016		0.0	334.029	-0.522		Vel = 3.80
CT3	0.0	5.86	1T	38.342	192.333	79.463		
to		150.0	1F	8.947	47.288	11.419		* * Fixed Loss = 11.419
UG1	-1167.17	-0.0366	1Zcg	0.0	239.621	-8.778		Vel = 13.88
	0.0							
	-1167.17					82.104		K Factor = -128.81
CT2	343.70	6.16	1E	20.084	22.500	79.985		
to		140.0	1G	4.304	67.425	-3.248		
CTY	343.7	0.0034	1T	43.037	89.925	0.306		Vel = 3.70
	0.0							
	343.70					77.043		K Factor = 39.16