

KPS

Fire ♦ Security ♦ Connectivity

KPS FIRE SPRINKLERS
CLASS C-16 LICENSE #954532
760 S. ROCHESTER AVE., SUITE B
ONTARIO, CA 91761
(909) 980-9222

Job Name : THE GROVE VILLAGE
Building : VILLAGE HOUSING PAD 1
Location : RIVERSIDE, CA 92508
System : KITCHEN
Contract : N/A
Data File : KITCHEN HYD CALC 16X16.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - THE GROVE VILLAGE Date - 10/19/2018
Location - RIVERSIDE, CA 92508
Building - VILLAGE HOUSING PAD 1 System No. - KITCHEN
Contractor - KPS FIRE SPRINKLERS Contract No. - N/A
Calculated By - LM Drawing No. - FP-2
Construction: (X) Combustible () Non-Combustible Ceiling Height 8'-0"
OCCUPANCY - R3

S Type of Calculation: ()NFPA 13 Residential ()NFPA 13R (X)NFPA 13D
Y Number of Sprinklers Flowing: ()1 (X)2 ()4 ()
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 16 x 16 () Deluge () PreAction
E Domestic Flow Added - 5 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make VIKING Model VK494
I Elevation at Highest Outlet - 8'-0"Feet Size 7/16" K-Factor 4.9
G Note: Temperature Rating 200
N

Calculation Gpm Required 26.682 Psi Required 24.829 AT BOR
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 60=54 Elev.
R Residual (Psi) - 20=18 Other Well
Flow (Gpm) - 1000 Proof Flow Gpm
S Elevation - 98 FT

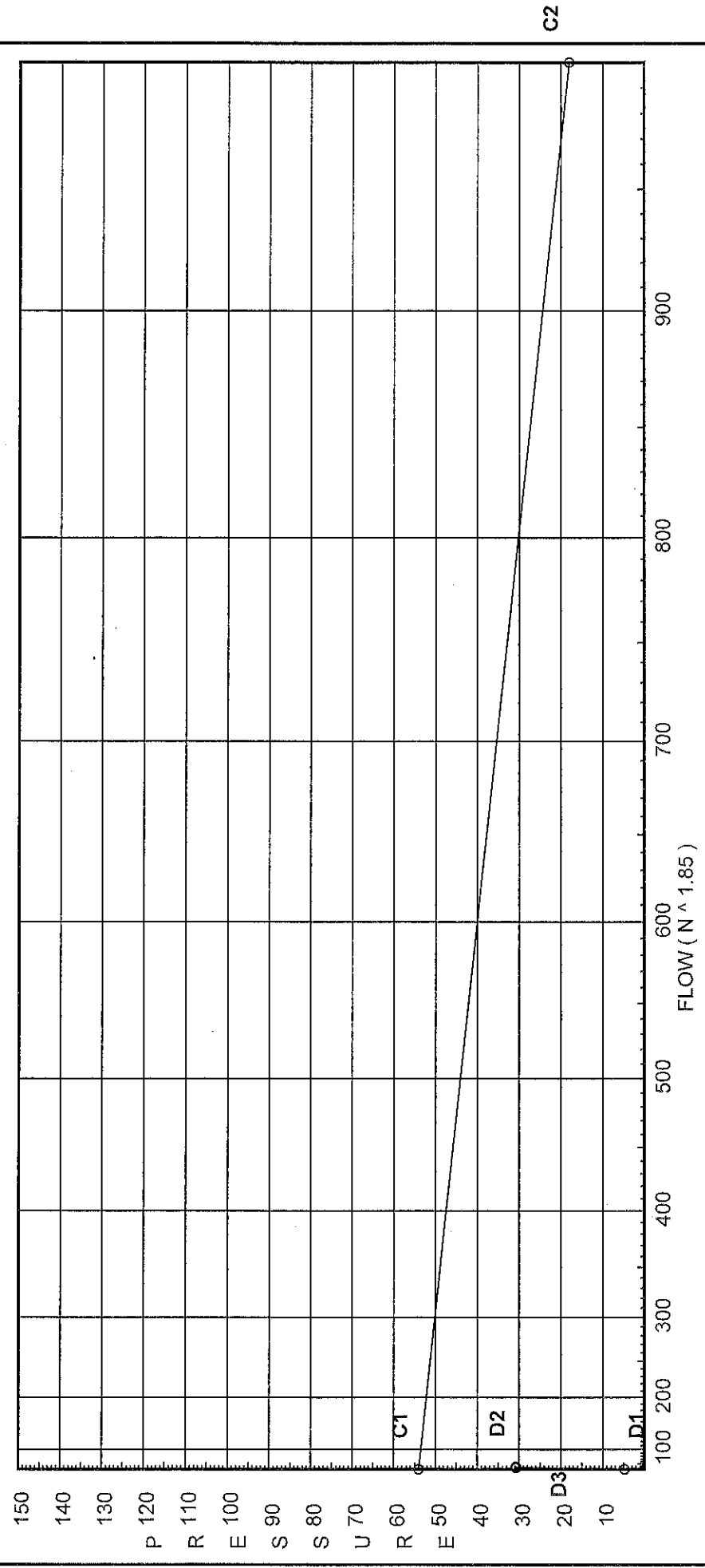
P Location:
P
L Source of Information:
Y

Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 54
C2 - Residual Pressure: 18
C2 - Residual Flow : 1000

Demand:
D1 - Elevation : 4.764
D2 - System Flow : 26.682
D2 - System Pressure : 30.729
Hose (Demand) : 5
D3 - System Demand : 31.682
Safety Margin : 23.210



Fittings Used Summary

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Fitting Legend Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
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
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
N *	CPVC 90' Ell Harvel-Spears	7	7	8	9	11	12	13	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
R *	CPVC Coupling Tee - Run	1	1	1	1	1	1	2	2	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

Unit 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

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H1	8.0	4.9	7.04	na	13.0	0.05	256	7.039
H2	8.0	4.9	7.8	na	13.68	0.05	256	7.039
D1	8.5		7.53	na				
1	8.5		7.94	na				
D2	8.5		7.94	na				
2	8.5		10.69	na				
3	8.5		8.78	na				
4	8.5		12.12	na				
TOR	8.5		15.69	na				
BOR	2.0		24.83	na	5.0			
UG1	-3.0		27.27	na				
UG2	-3.0		27.54	na				
100	-3.0		29.47	na				
101	-3.0		30.13	na				
SRC	-3.0		30.73	na				

The maximum velocity is 14.27 and it occurs in the pipe between nodes 4 and TOR

Final Calculations - Hazen-Williams - 2007

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H1 to D1	13.00 13.0	0.874 150.0 0.0945	N	7.0 0.0 0.0	0.500 7.000 7.500	7.039 -0.217 0.709			K Factor = 4.90 Vel = 6.95	
	0.0 13.00						7.531		K Factor = 4.74	
H2 to D2	13.68 13.68	0.874 150.0 0.1037	O	3.0 0.0 0.0	0.500 3.000 3.500	7.797 -0.217 0.363			K Factor = 4.90 Vel = 7.32	
	0.0 13.68						7.943		K Factor = 4.85	
D1 to 1	13.00 13.0	0.874 150.0 0.0944	O	3.0 0.0 0.0	1.292 3.000 4.292	7.531 0.0 0.405			Vel = 6.95	
1 to D2	-12.51 0.49	0.874 150.0 0.0002	N O R	7.0 3.0 1.0	23.083 11.000 34.083	7.936 0.0 0.007			Vel = 0.26	
D2 to 2	13.68 14.17	0.874 150.0 0.1108	N	7.0 0.0 0.0	17.792 7.000 24.792	7.943 0.0 2.746			Vel = 7.58	
2 to 4	0.0 14.17	0.874 150.0 0.1107	2R O	2.0 3.0 0.0	7.958 5.000 12.958	10.689 0.0 1.435			Vel = 7.58	
	0.0 14.17						12.124		K Factor = 4.07	
1 to 3	12.51 12.51	0.874 150.0 0.0879	O	3.0 0.0 0.0	6.583 3.000 9.583	7.936 0.0 0.842			Vel = 6.69	
3 to 4	0.0 12.51	0.874 150.0 0.0880	2N 2R O	14.0 2.0 3.0	19.042 19.000 38.042	8.778 0.0 3.346			Vel = 6.69	
4 to TOR	14.17 26.68	0.874 150.0 0.3570	N	7.0 0.0 0.0	3.000 7.000 10.000	12.124 0.0 3.570			Vel = 14.27	
	0.0 26.68						15.694		K Factor = 6.73	
TOR to BOR	26.68 26.68	1.101 150.0 0.1160	3R 2S Fsp	3.0 19.125 0.0	6.500 22.126 28.626	15.694 5.815 3.320			* Fixed Loss = 3 Vel = 8.99	
	0.0 26.68						24.829		K Factor = 5.35	
BOR to UG1	31.68 31.68	1.61 150.0 0.0250	E	6.044 0.0 0.0	5.000 6.044 11.044	24.829 2.166 0.276			Qa = 5 Vel = 4.99	
UG1 to UG2	0.0 31.68	1.61 150.0 0.0250	E	6.044 0.0 0.0	4.500 6.044 10.544	27.271 0.0 0.264			Vel = 4.99	
UG2 to 100	0.0 31.68	1.61 150.0 0.0250	T	12.089 0.0 0.0	65.000 12.089 77.089	27.535 0.0 1.931			Vel = 4.99	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
100	0.0	2.067	2T	30.221	60.000	29.466			
to		150.0		0.0	30.221	0.0			
101	31.68	0.0074		0.0	90.221	0.669		Vel = 3.03	
101	0.0	2.067	T	15.111	65.000	30.135			
to		150.0		0.0	15.111	0.0			
SRC	31.68	0.0074		0.0	80.111	0.594		Vel = 3.03	
	0.0								
	31.68					30.729		K Factor = 5.71	