Hydraulic Overview

BLD18-5684DF01 PC1

Job Number: 19865
Report Description: NFPA13D 2016

Job

Job Number: 19865	Design Engineer: Larry Clem
Job Name: HUNLEY RESIDENCE	Phone:	FAX:
Address 1: 10 OXFORD COURT	State Certification/License Number: C-16 898055
Address 2: SANTA ROSA, CALIFORNIA	AHJ: LOCAL FIRE DEPARTMENT
Address 3:	Job Site/Building: FIRE RESTORATION

System

Density: 0.500gpm/ft²	Area of Application: 392.00ft²
Most Demanding Sprinkler Data: 3.7 K-Factor 10.00 at 7.305	Hose Streams: 0.00
Coverage Per Sprinkler: 196.00ft²	Number Of Sprinklers Calculated: 2
System Pressure Demand: 37.771	System Flow Demand: 25.00
Total Demand: 25.00 @ 37.771	Pressure Result: +32.229 (46.0%)

THESE ATTACHMENTS ARE PART OF THE APPROVED PLANS *DO NOT REMOVE THEM*

OCT 23 2019

PRMD RESILIENCY PERMIT CENTER

PERMIT # BLD18-5684.DF01

Supplies

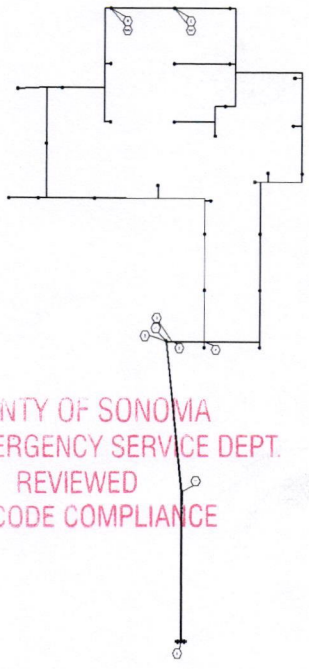
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	980.00		70.000	70.000

REVIEWED FOR CODE COMPLIANCE
OCT 23 2019
RESILIENCY PERMIT CENTER

Check Point Gauges

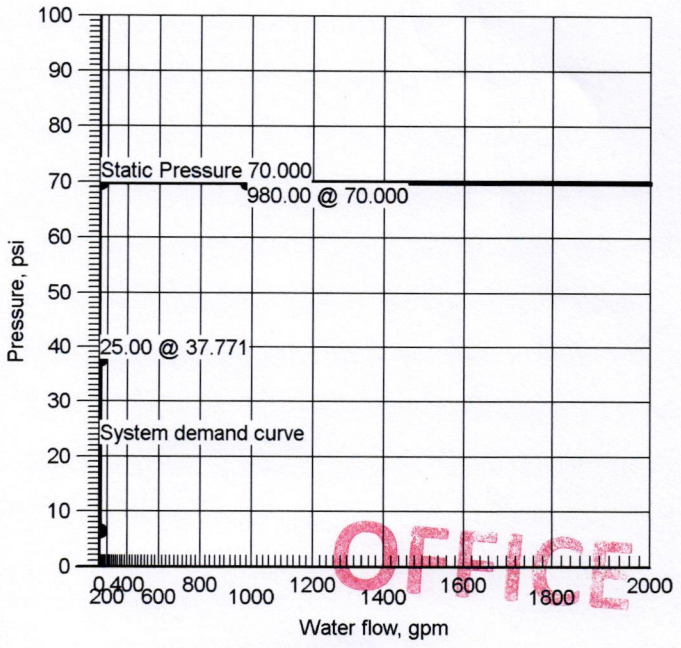
Identifier	Pressure(psi)	K-Factor(K)	Flow(gpm)

865Hunley_FP1



COUNTY OF SONOMA
FIRE & EMERGENCY SERVICE DEPT.
REVIEWED
FOR CODE COMPLIANCE

Water Supply at Node 1 (980.00, 0.00, 70.000, 70.000)



OFFICE

Hydraulic Summary

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Report Description: NFPA13D 2016

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Address 1: 10 OXFORD COURT	AHJ: LOCAL FIRE DEPARTMENT
Address 2: SANTA ROSA, CALIFORNIA	Job Site/Building: FIRE RESTORATION
Address 3:	Drawing Name: 865Hunley_FP1

System

Most Demanding Sprinkler Data: 3.7 K-Factor 10.00 at 7.305

Hose Allowance At Source: 0.00

Additional Hose Supplies

Node	Flow(gpm)
Hydrant At Node 4	5.00

Total Hose Streams: 5.00

System Flow Demand	Total Water Required (Including Hose Allowance)
25.00	25.00

Maximum Pressure Unbalance In Loops: 0.000

Maximum Velocity Above Ground: 9.18 between nodes 3 and 4

Maximum Velocity Under Ground: 4.66 between nodes 1 and 2

Volume capacity of Wet Pipes	Volume capacity of Dry Pipes
21.84gal	

Remote Area(s)

Occupancy	Job Suffix
Residential	Manually Flowing
Density	**Area of Application**
0.500gpm/ft²	392.00ft²
Number Of Sprinklers Calculated	**Coverage Per Sprinkler**
2	196.00ft²

AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area

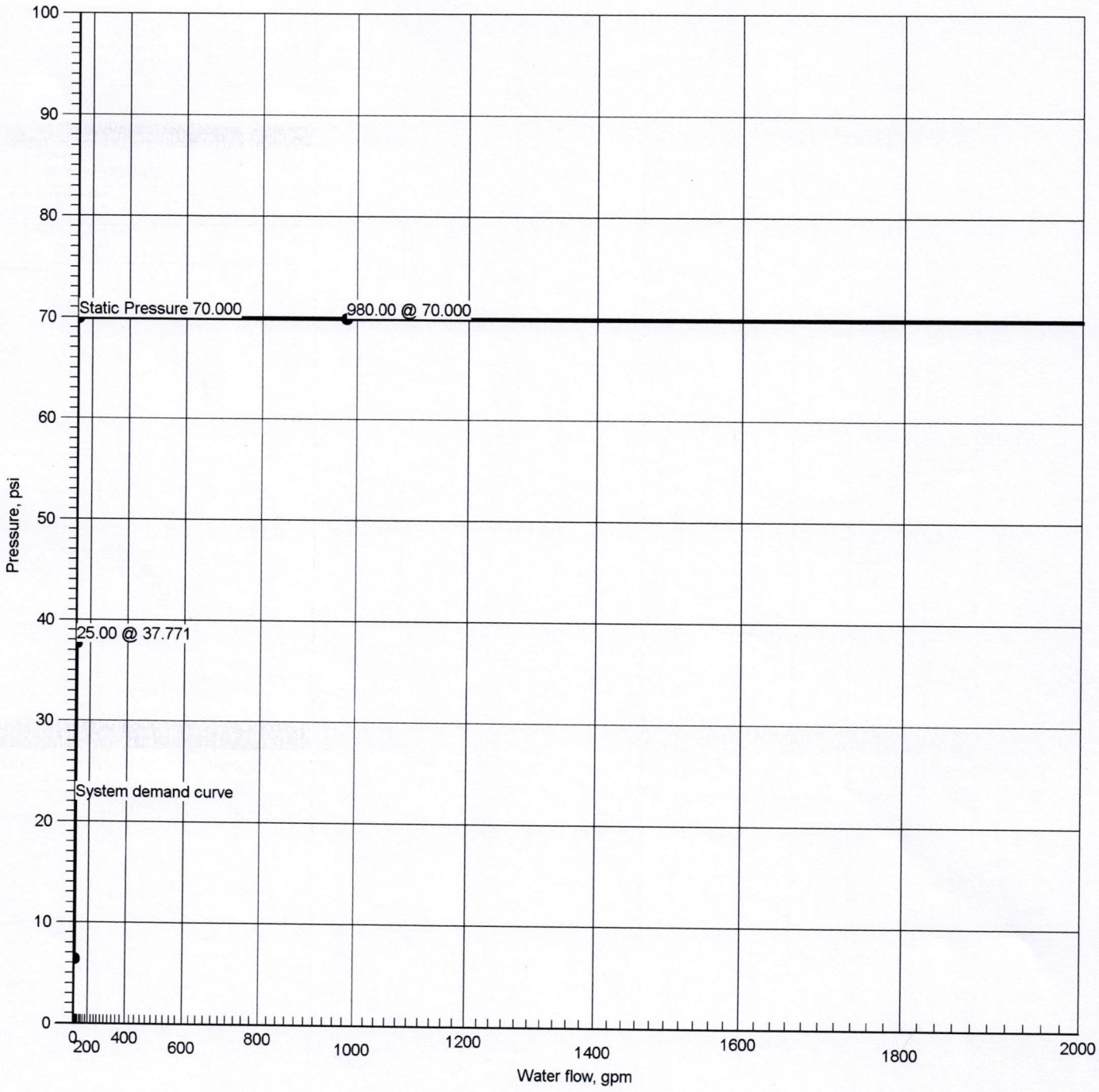
Supplies

Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply		70.000	70.000		980.00	70.000		25.00	37.771	32.229

Contractor

Contractor Number: 19865		Contact Name: SHAUN LEWIS	Contact Title: OWNER
Name of Contractor: THIRD GENERATION PLUMBING		Phone: 707-888-1162	Extension:
Address 1: P.O. BOX 932		FAX:	
Address 2: COTATI, CALIFORNIA		E-mail:	
Address 3:		Web-Site:	

Water Supply at Node 1



Hydraulic Graph
Water Supply at Node 1

Static: Pressure
70.000

Residual: Pressure
70.000 @ 980.00

Available Pressure at Time of Test
70.000 @ 25.00

System Demand
37.771 @ 25.00

System Demand (Including Hose Allowance at Source)
37.771 @ 25.00

Summary Of Outflowing Devices

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Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
Hydrant	4	5.00	5.00	0	20.706		
Sprinkler	**101**	**10.00**	**10.00**	**3.7**	**7.305**		
Sprinkler	102	10.00	10.00	3.7	7.305		

⇨ Most Demanding Sprinkler Data

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)	
1	-4'-0	S, T(8'-0)	37.771	25.00	
4	1'-0	Hyd	20.706	5.00	
101	10'-11	Spr(-7.305)	7.305	10.00	
102	10'-11	Spr(-7.305)	7.305	10.00	
2	-1'-0	E(9'-0)	22.590		
3	-0'-6	cplg(0'-6)	21.610		
5	2'-6	E(7'-0)	15.720		
6	11'-5	E(7'-0)	10.766		
7	11'-5	C(5'-0), Tr(1'-0)	9.897		
8	11'-5	T(5'-0), Tr(1'-0)	7.192		
9	11'-5	T(5'-0)	7.192		

Hydraulic Analysis

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Pipe Type / Downstream / Upstream	Diameter / Elevation	Flow / Discharge	Velocity / K-Factor	HWC / Pt	Pn	Friction Loss / Fittings	Length / Eq. Length / Total Length	Pressure Summary
• • • • • Route 1 • • • • •								
DR	1.1010	10.00	3.37	150		0.018874	0'-6	Pf 0.104
101	10'-11	10.00	3.7	7.305		Sprinkler,	5'-0	Pe -0.217
9	11'-5			7.192		T(5'-0)	5'-6	Pv
BL	1.1010	9.93	3.35	150		0.018638	100'-1¾	Pf 2.705
9	11'-5			7.192			45'-0	Pe
7	11'-5			9.897		9Tr(1'-0), 3E(7'-0), 3T(5'-0)	145'-1¾	Pv
BL	1.1010	20.00	6.74	150		0.068041	5'-9¼	Pf 0.869
7	11'-5	10.07		9.897		Flow (q) from Route 2	7'-0	Pe
6	11'-5			10.766		E(7'-0)	12'-9¼	Pv
FR	1.1010	20.00	6.74	150		0.068041	8'-11	Pf 1.084
6	11'-5			10.766			7'-0	Pe 3.870
5	2'-6			15.720		E(7'-0)	15'-11	Pv
FR	1.0550	20.00	7.34	150		0.083760	2'-6	Pf 4.340
5	2'-6			15.720			13'-6	Pe 0.647
4	1'-0			20.706		E(2'-0), f(-3.000), Tr(0'-6), sCV(11'-0), Hyd	16'-0	Pv
FR	1.0550	25.00	9.18	150		0.126567	1'-6	Pf 0.253
4	1'-0	5.00		20.706			0'-6	Pe 0.650
3	-0'-6			21.610		BalV, cplg(0'-6)	2'-0	Pv
UG	1.5980	25.00	4.00	150		0.016755	27'-8	Pf 0.765
3	-0'-6			21.610			18'-0	Pe 0.215
2	-1'-0			22.590		2E(9'-0)	45'-8	Pv
UG	1.4810	25.00	4.66	150		0.024264	32'-6	Pf 13.880
2	-1'-0			22.590			45'-0	Pe 1.301
1	-4'-0			37.771		6E(2'-6), BFP(-10.000), WMV(-2.000), AngV(18'-0), LtE(2'-0), BalV(2'-0), S, T(8'-0)	77'-6	Pv
		0.00				Hose Allowance At Source		
1		25.00						
• • • • • Route 2 • • • • •								
DR	1.1010	10.00	3.37	150		0.018874	0'-6	Pf 0.104
102	10'-11	10.00	3.7	7.305		Sprinkler,	5'-0	Pe -0.217
8	11'-5			7.192		T(5'-0)	5'-6	Pv
BL	1.1010	10.07	3.39	150		0.019112	99'-6½	Pf 2.705
8	11'-5	0.07		7.192		Flow (q) from Route 3	42'-0	Pe
7	11'-5			9.897		2E(7'-0), 8Tr(1'-0), 3T(5'-0), C(5'-0)	141'-6½	Pv
• • • • • Route 3 • • • • •								
BL	1.1010	0.07	0.02	150		0.000002	11'-5	Pf 0.000
9	11'-5			7.192			1'-0	Pe
8	11'-5			7.192		Tr(1'-0)	12'-5	Pv

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

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

C Value Multiplier

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

Pipe Type	Diameter	Flow	Velocity	HWC		Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend

AO	Arm-Over
BL	Branch Line
CM	Cross Main
DN	Drain
DR	Drop
DY	Dynamic
FM	Feed Main
FR	Feed Riser
MS	Miscellaneous
OR	Outrigger
RN	Riser Nipple
SP	Sprig
ST	Stand Pipe
UG	Underground

Units Legend

Diameter	Inch
Elevation	Foot
Flow	gpm
Discharge	gpm
Velocity	fps
Pressure	psi
Length	Foot
Friction Loss	psi/Foot
HWC	Hazen-Williams Constant
Pt	Total pressure at a point in a pipe
Pn	Normal pressure at a point in a pipe
Pf	Pressure loss due to friction between points
Pe	Pressure due to elevation difference between indicated points
Pv	Velocity pressure at a point in a pipe

Fittings Legend

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