

# Hydraulic Calculations for



**Project:** MONTOYA MAIN RESIDENCE  
COCKRILL STREET  
BLOOMFIELD, CA.  
APN - 026-100-027

**Drawing no.:** FPS- 02  
**Date:** 1/21/2025

## Design

**Remote area number:** 1  
**Remote area location:** UF - LANDING  
**Occupancy classification:** light hazard  
**Density:** .05  
**Area of application:** 256  
**Coverage per sprinkler:** 16' X 16'  
**Type of sprinklers calculated:** SENJU RC-RES 4.9K CONCEALED SSP  
**No. of sprinklers calculated:** 2  
**Hose streams:** none outside + 5 GPM DOMESTIC DEMAND inside  
**Total water required (including hose streams):** 31.46 gpm at -14.87 psi [ 17.87 psi safety margin (595.6%) ]  
**Total water required at base of system riser:** 26.46 gpm at 25.12 psi  
**Maximum water flow velocity:** 11.546 ft/s  
**Type of system:** wet pipe

## Water Supply Information

**Date:**  
**Location:**  
**Source:** PUMP

**Contractor:** NEMESIS FIRE PROTECTION  
P.O. BOX 11651  
SANTA ROSA, CA. 95406  
707-495-5051

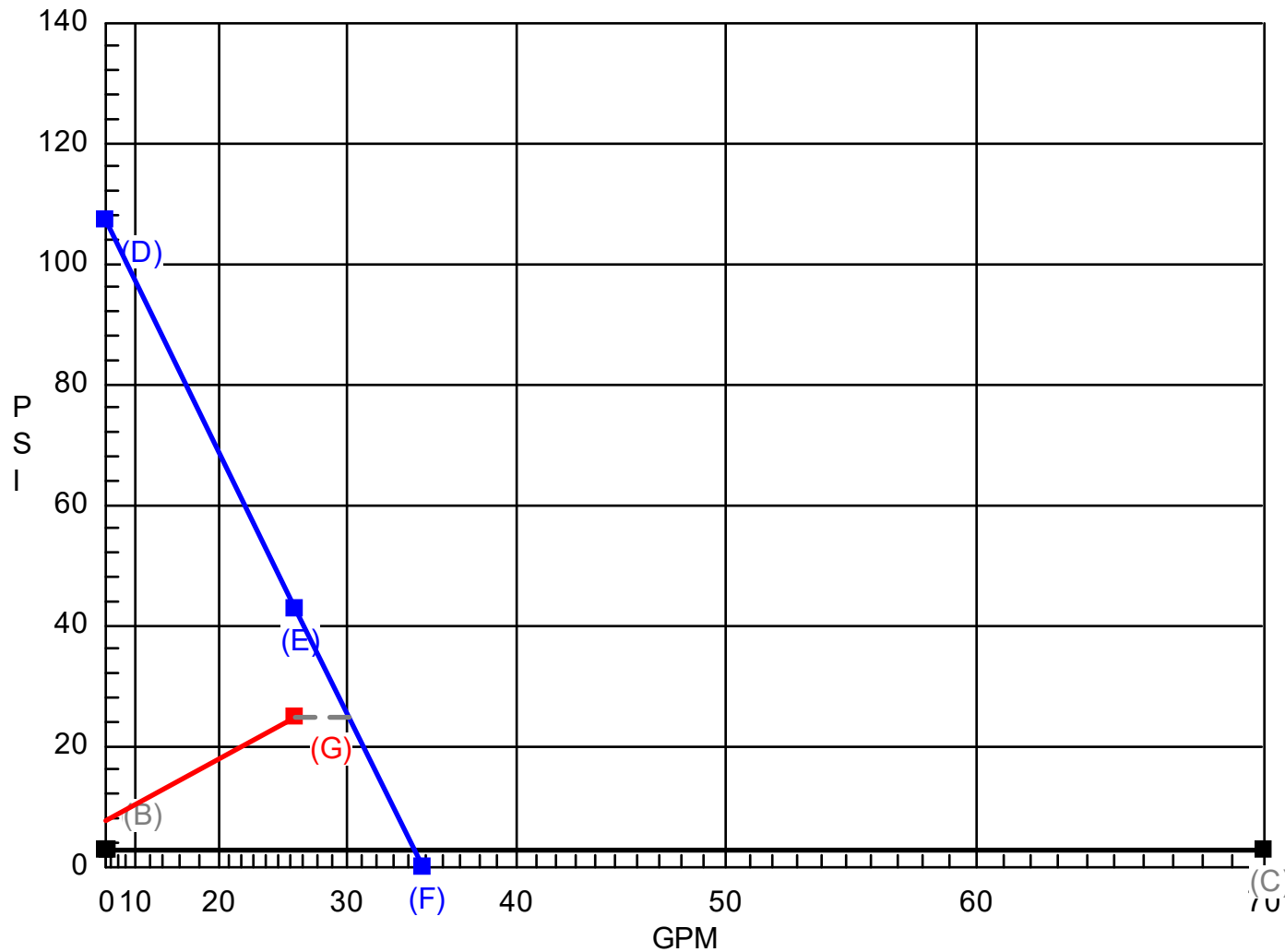
**Name of designer:** DDD

**Authority having jurisdiction:** SONOMA COUNTY

## Notes

(N) 10,000 GAL WATER STORAGE TANK  
(N) FIRE PUMP; 35 GPM @ 50 PSI minimum output  
(N) 2" PVC PIPE FROM FIRE PUMP TO RESIDENCE  
(N) 1" COPPER PIPE FROM UG TO BOTTOM OF ASR  
(N) 1" ASR - AUTOMATIC SPRINKLER RISER

### Hydraulic Demand Graph



Water Source:

- A) 3 psi Static
- B) 3 gpm at 3 psi
- C) 70 gpm at 3 psi

Source at BOR:

- D) 107.57 psi Static
- E) 26.5 gpm at 42.99 psi
- F) 34.9 gpm at 0 psi

Demand at BOR:

- G) 26.5 gpm at 25.12 psi

### Supply Analysis

Node at	Static Pressure [psi]	Residual Pressure [psi]	Flow [gpm]	Available Pressure [psi]	Total Demand [gpm]	Required Pressure [psi]
TNK	3.0	3.0	3.0	3.0	31.46	-14.87

### Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
TNK	501.000	source	-14.867	-31.458
EP	501.000	ref	36.007	0.000
UG1	496.000	ref	37.848	0.000
UG2	496.000	ref	37.085	0.000
DOM	501.000	ref	26.626	5.000
BOR	502.000	ref	25.124	0.000
TOR	504.000	ref	18.562	0.000
7	510.000	ref	14.594	0.000
6	510.000	ref	14.141	0.000
5	520.000	ref	8.947	0.000
4	520.000	ref	7.912	0.000
3	520.000	ref	9.170	0.000
1	520.000	ref	7.529	0.000
H1	520.000	K=4.90	7.039	13.000
H2	520.000	K=4.90	7.543	13.458
H3	520.000	ref	9.170	0.000

### Pipe Information

negative pipe flow (Q) indicates flow is from node 2 towards node 1

Node 1	Elev [ft]	K-factor	Discharge & Flow [gpm]	Nom i.d. [in]	Fittings num & length [ft]	L [ft] F [ft] T [ft]	C factor psi/ft	total (Pt) elev (Pe) frict (Pf)	Notes
H1	520.000	4.9	q= 13.000 Q= -13.000	1 1.101	1E=5.000 1T=6.000	5.000 11.000 16.000	C=150	Pt= 7.039 Pe= 0.000 Pf= -0.491	Mat="CPVC"
1	520.000								
1	520.000		q= 0.000 Q= -1.735	1 1.101	2T=12.000	6.750 12.000	C=150	Pt= 7.529 Pe= 0.000 Pf= -0.014	Mat="CPVC"
H2	520.000					18.750	0.001		
H2	520.000	4.9	q= 13.458 Q= -15.193	1 1.101	3T=18.000	21.750 18.000	C=150	Pt= 7.543 Pe= 0.000 Pf= -1.626	Mat="CPVC"
3	520.000					39.750	0.041		
H3	520.000		q= 0.000 Q= 0.000	1 1.101	1E=5.000 1T=6.000	32.500 11.000	C=150	Pt= 9.170 Pe= 0.000 Pf= 0.000	Mat="CPVC"
3	520.000					43.500	0		
3	520.000		q= 0.000 Q= -15.193	1 1.101	1E=5.000 1T=6.000	15.750 11.000	C=150	Pt= 9.170 Pe= -4.330 Pf= -1.095	Mat="CPVC"
7	510.000					26.750	0.041		
1	520.000		q= 0.000 Q= -11.265	1 1.101	1T=6.000	10.250 6.000	C=150	Pt= 7.529 Pe= 0.000 Pf= -0.382	Mat="CPVC"
4	520.000					16.250	0.024		
4	520.000		q= 0.000 Q= -11.265	1 1.101	2E=10.000 1T=6.000	28.000 16.000	C=150	Pt= 7.912 Pe= 0.000 Pf= -1.035	Mat="CPVC"
5	520.000					44.000	0.024		
5	520.000		q= 0.000 Q= -11.265	1 1.101	1T=6.000	30.750 6.000	C=150	Pt= 8.947 Pe= -4.330 Pf= -0.865	Mat="CPVC"
6	510.000					36.750	0.024		
6	510.000		q= 0.000 Q= -11.265	1 1.101	1T=6.000	13.250 6.000	C=150	Pt= 14.141 Pe= 0.000 Pf= -0.453	Mat="CPVC"
7	510.000					19.250	0.024		
7	510.000		q= 0.000 Q= -26.458	1 1.101	1T=6.000	6.000 6.000	C=150	Pt= 14.594 Pe= -2.598 Pf= -1.370	Mat="CPVC"
TOR	504.000					12.000	0.114		
TOR	504.000		q= 0.000 Q= -26.458	1 1.055	1C=7.768	2.000 7.768	C=150	Pt= 18.562 Pe= -0.866 Pf= -1.373	Mat="CM" Pdev=-4.32 psi
BOR	502.000					9.768	0.141		
BOR	502.000		q= 0.000 Q= -26.458	1 1.055	2CME=6.600	1.000 6.600	C=150	Pt= 25.124 Pe= -0.433 Pf= -1.068	Mat="CM"
DOM	501.000					7.600	0.141		
DOM	501.000		q= 5.000 Q= -31.458	1 1.055	1LV=38.841	4.000 38.841	C=150	Pt= 26.626 Pe= -2.165 Pf= -8.294	Mat="CM"
UG2	496.000					42.841	0.194		
UG2	496.000		q= 0.000 Q= -31.458	2 2.003	3E=19.447	70.000 19.447	C=150	Pt= 37.085 Pe= 0.000 Pf= -0.763	Mat="PVC"
UG1	496.000					89.447	0.009		

Pipe Information, cont.

Node 1	Elev	K-factor	Discharge & Flow	Nom i.d.	Fittings num & length	L [ft]	C factor	total (Pt) elev (Pe)	Notes
Node 2	[ft]		[gpm]	[in]	[ft]	F [ft]	psi/ft	frict (Pf)	
UG1	496.000		q= 0.000 Q= -31.458	2 2.003	2E=12.965	25.000		Pt= 37.848 Pe= 2.165	Mat="PVC"
EP	501.000					37.965	0.009	Pf= -0.324	
EP	501.000		q= 0.000 Q= -31.458	2 2.003	3E=19.447 1LV=68.713	10.000 88.160		Pt= 36.007 Pe= 0.000	Mat="PVC" Pdev=51.71 psi
TNK	501.000					98.160	0.009	Pf= -0.837	

Material Codes

Pipe Material

CM - Copper Tube Type M  
 PVC - PVC C900 Pressure Class 150  
 CPVC - CPVC SDR 13.5 ASTM F442

Fittings

C - Check Valve (Swing)  
 E - Standard 90 degree elbow  
 LV - Globe Valve  
 CME [CM] - COPPER M 90 EL  
 E [CPVC] - ASTM CPVC 90 degree elbow  
 T [CPVC] - ASTM CPVC Tee - Flow turn 90 degrees

