

PINEHURST FIRE DEPARTMENT  
 395 MAGNOLIA ROAD  
 PINEHURST, NC 28374  
 RESIDENTIAL SPRINKLER SYSTEM

HYDRAULICS CALCULATION REPORT

FOR  
 HfH Moore 1056 glade m  
 Pinehurst, NC  
 Bonsal Way, Aberdeen, NC

Date: 4/14/2008  
 File No: HfH Moore 1056  
 Data File Name: HfH Moore 1056 glade m.rdf

SPRINKLER SPACING

256.0 sq. ft./spklr.(max)      Max. Dist. Bet. Spklrs:      16.0 ft.  
 Min. Dist. Bet. Spklrs: 8.0      Max. Dist. Spklr. to Wall:      8.0 ft.

SPRINKLER SPECIFICATIONS

Mfr: Viking Descr: VK438 Pend.(16x16) K=4.90  
 Calculated K Factor for Arm-Overs & Drops:  
     1.0 ft. x 0.874 in. Drop:      K=4.73 (Incl. 1 Tee)  
     0.0 ft. x 1.101 in. Arm-Over: K=4.81 (Incl. 1 Tee & 1 Ell)

PIPE SPECIFICATIONS

Type: BlazeMaster HWC: 150

WATER SUPPLY

Source: Public Test Date: 1/8/2008 By: AHJ  
 Static: 53.0 psi Resid: 48.0 psi Flow: 711.0 gpm  
 Public Main Size: 6 in  
 Domestic Demand: 5.0 gpm at node number 2

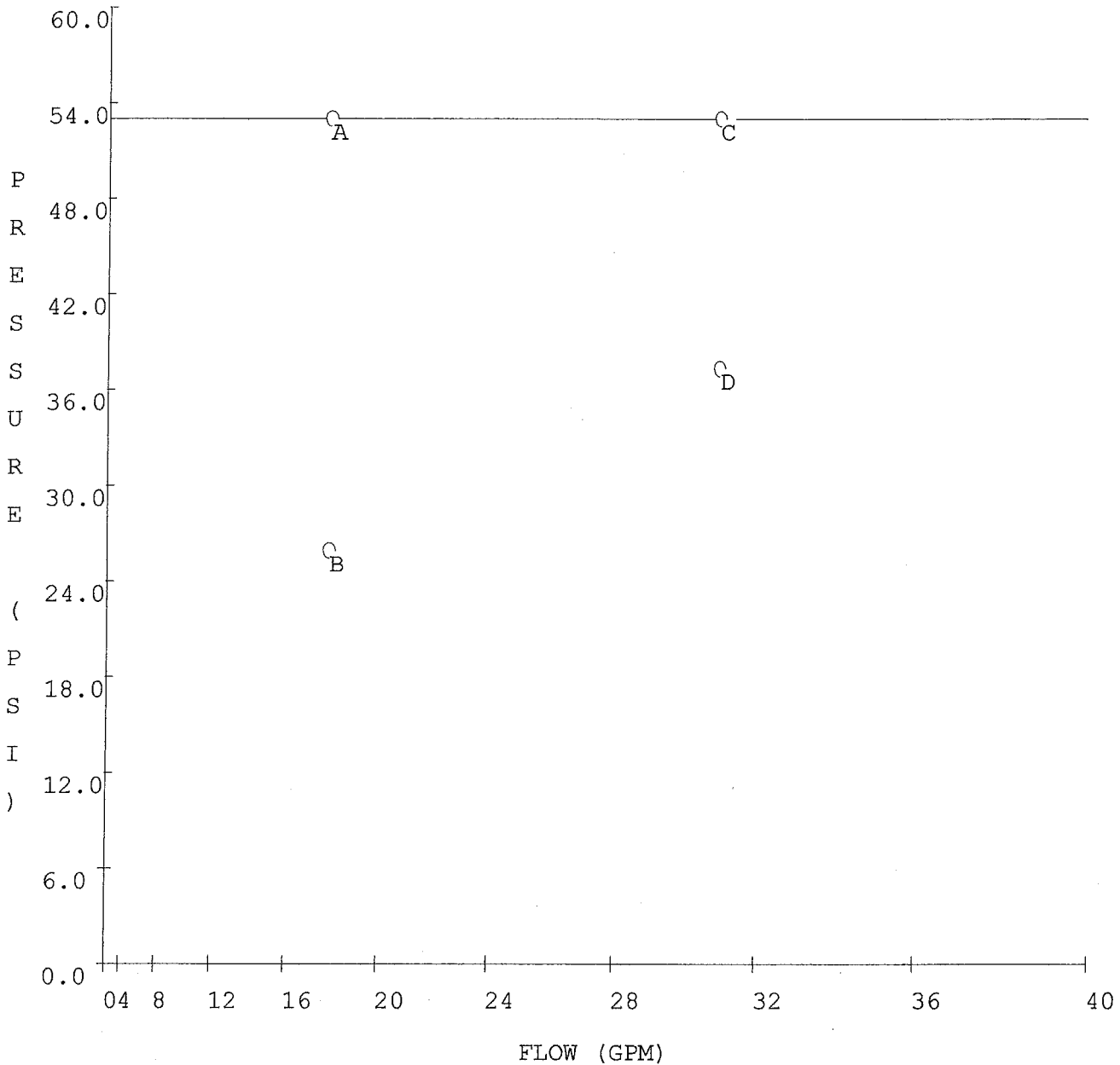
SPRINKLER DEMAND

No. Spklrs. Flowing	Min Spklr. Flow	Press. (psi)	Node No.	Total Flow	Avail. Press.	Req'd Press.
1	13.0	7.0	6	18.0	53.0	25.9
2	13.0	7.0	7	31.0	53.0	37.3

REVIEWING AUTHORITY

Pinehurst Fire / Aberdeen Fire

WATER SUPPLY CURVE



Static = 53.0 psi, Residual = 48.0 psi @ 711 gpm

(1 sprinkler flowing)	(2 sprinklers flowing)
A = Available Water Supply	C = Available Water Supply
53.0 psi @ 18.0 gpm	53.0 psi @ 31.0 gpm
B = Required Water Supply	D = Required Water Supply
25.9 psi @ 18.0 gpm	37.3 psi @ 31.0 gpm

RESULTS OF ANALYSIS

NFPA NODE & PIPE DATA

1 Sprinkler Flowing

Node Tag	Elevation (FT)	Node Type	Pressure (PSI)	Discharge (GPM)	Notes
1	10.0	SOURCE	25.9	- - -	
2	10.0	DOMESTIC	8.7	5.0	
3	10.0	- - - -	8.6	- - -	
4	10.0	- - - -	8.1	- - -	
5	10.0	- - - -	7.8	- - -	
6	10.0	K= 4.90	7.0	13.0	
7	10.0	- - - -	7.2	- - -	
8	10.0	- - - -	7.4	- - -	
9	10.0	- - - -	7.8	- - -	
10	10.0	- - - -	8.0	- - -	
11	10.0	- - - -	8.1	- - -	
12	10.0	- - - -	8.6	- - -	

Pipe Tag	K-fac	AF	AF to	L	C	(Pt)	Notes
End El (ft)	PT	(q)	node/ Nom ID	F		(Pe)	
Nodes El (ft)	PT	TF(Q)	disch Act ID	T	FL/FT	(Pf)	
5.0 Disch							
Pipe: 1	DOM.	5.1	12	R: 1	65.00	150	17.2
1	10.0	25.9	7.9 3	1.000	L: 7	10.00	0.0
2	10.0	8.7	18.0	1.101	G: 2	75.00	0.056
Fixed Pressure Loss Device:13.00 psi							
Pipe: 2	0.00				2.50	150	0.1
2	10.0	8.7	7.9 4	0.750	R: 1	1.00	0.0
3	10.0	8.6	7.9	0.874		3.50	0.038
Pipe: 3	0.00				10.50	150	0.4
3	10.0	8.6	7.9 5	0.750	R: 1	1.00	0.0
4	10.0	8.1	7.9	0.874		11.50	0.038
Pipe: 4	0.00				7.50	150	0.3
4	10.0	8.1	7.9 6	0.750	R: 1	1.00	0.0
5	10.0	7.8	7.9	0.874		8.50	0.038
Pipe: 5	4.90	13.0 Disch			12.50	150	0.8
5	10.0	7.8	-5.1 7	0.750	L: 7	8.00	0.0
6	10.0	7.0	7.9	0.874		20.50	0.038
Pipe: 6	4.90	13.0 Disch			6.50	150	0.1
7	10.0	7.2	-7.9 5	0.750	2R: 2	2.00	0.0
6	10.0	7.0	5.1	0.874		8.50	0.017
Pipe: 7	0.00				10.50	150	0.2
8	10.0	7.4	5.1 6	0.750	B: 3	4.00	0.0
7	10.0	7.2	5.1	0.874		14.50	0.017
Pipe: 8	0.00				10.50	150	0.4
9	10.0	7.8	5.1 7	0.750	2L:14	15.00	0.0

8	10.0	7.4	5.1		0.874		25.50	0.017	0.4
Pipe: 9		0.00					6.00	150	0.1
10	10.0	8.0	5.1	8	0.750	2R: 2	2.00		0.0
9	10.0	7.8	5.1		0.874		8.00	0.017	0.1
Pipe: 10		0.00					7.00	150	0.1
11	10.0	8.1	5.1	9	0.750	R: 1	1.00		0.0
10	10.0	8.0	5.1		0.874		8.00	0.017	0.1
Pipe: 11		0.00				R: 1	13.00	150	0.5
12	10.0	8.6	5.1	10	0.750	2L:14	15.00		0.0
11	10.0	8.1	5.1		0.874		28.00	0.017	0.5
Pipe: 12		0.00					7.00	150	0.1
2	10.0	8.7	5.1	11	0.750	----	0.00		0.0
12	10.0	8.6	5.1		0.874		7.00	0.017	0.1

RESULTS OF ANALYSIS

NFPA NODE & PIPE DATA

2 Sprinklers Flowing

Node Tag	Elevation (FT)	Node Type	Pressure (PSI)	Discharge (GPM)	Notes
1	10.0	SOURCE	37.3	- - -	
2	10.0	DOMESTIC	12.8	5.0	
3	10.0	- - - -	12.4	- - -	
4	10.0	- - - -	10.9	- - -	
5	10.0	- - - -	9.8	- - -	
6	10.0	K= 4.90	7.1	13.0	
7	10.0	K= 4.90	7.0	13.0	
8	10.0	- - - -	8.0	- - -	
9	10.0	- - - -	9.6	- - -	
10	10.0	- - - -	10.1	- - -	
11	10.0	- - - -	10.6	- - -	
12	10.0	- - - -	12.4	- - -	

Pipe Tag	K-fac	AF	AF to	L	C	(Pt)	Notes
End El (ft)	PT	(q)	node/ Nom ID	F		(Pe)	
Nodes El (ft)	PT	TF(Q)	disch Act ID	T	FL/FT	(Pf)	

odd

Pipe: 1	DOM.	10.5	12	5.0 Disch	R: 1	65.00	150	24.5
1	10.0	37.3	15.5	3	1.000	L: 7	10.00	0.0
2	10.0	12.8	58.8		1.101	G: 2	75.00	0.500
Fixed Pressure Loss Device: 13.0 psi								
Pipe: 2	0.00					2.50	150	0.5
2	10.0	12.8	15.5	4	0.750	R: 1	1.00	0.0
3	10.0	12.4	15.5		0.874		3.50	0.131
Pipe: 3	0.00					10.50	150	1.5
3	10.0	12.4	15.5	5	0.750	R: 1	1.00	0.0
4	10.0	10.9	15.5		0.874		11.50	0.131

Pipe: 4	0.00						7.50	150	1.1
4	10.0	10.9	15.5	6	0.750	R: 1	1.00		0.0
5	10.0	9.8	15.5		0.874		8.50	0.131	1.1
Pipe: 5	4.90	13.0	Disch			R: 1	12.50	150	2.7
5	10.0	9.8	2.5	7	0.750	L: 7	8.00		0.0
6	10.0	7.1	15.5		0.874		20.50	0.131	2.7
Pipe: 6	4.90	-13.0	Disch				6.50	150	0.0
7	10.0	7.0	15.5	5	0.750	2R: 2	2.00		0.0
6	10.0	7.1	2.5		0.874		8.50	0.004	0.0
Pipe: 7	4.90	13.0	Disch			R: 1	10.50	150	0.9
8	10.0	8.0	-2.5	6	0.750	B: 3	4.00		0.0
7	10.0	7.0	10.5		0.874		14.50	0.064	0.9
Pipe: 8	0.00					R: 1	10.50	150	1.6
9	10.0	9.6	10.5	7	0.750	2L:14	15.00		0.0
8	10.0	8.0	10.5		0.874		25.50	0.064	1.6
Pipe: 9	0.00						6.00	150	0.5
10	10.0	10.1	10.5	8	0.750	2R: 2	2.00		0.0
9	10.0	9.6	10.5		0.874		8.00	0.064	0.5
Pipe: 10	0.00						7.00	150	0.5
11	10.0	10.6	10.5	9	0.750	R: 1	1.00		0.0
10	10.0	10.1	10.5		0.874		8.00	0.064	0.5
Pipe: 11	0.00					R: 1	13.00	150	1.8
12	10.0	12.4	10.5	10	0.750	2L:14	15.00		0.0
11	10.0	10.6	10.5		0.874		28.00	0.064	1.8
Pipe: 12	0.00						7.00	150	0.4
2	10.0	12.8	10.5	11	0.750	----	0.00		0.0
12	10.0	12.4	10.5		0.874		7.00	0.064	0.4

## Legend:

PT - Total Pressure at Node

Fl - Flow rate (gpm)

L - Pipe Length

F - Fitting Length

T - Total Length of Pipe

C - Hazen-Williams Coefficient

FL/FT - Friction Loss per Foot

Pt - Total Pressure Loss

Pe - Elevation Pressure Loss

Pf - Friction Pressure Loss

## Fitting Code Letters:

E=45 Ell, L=90 Ell, B=TeeBch, R=TeeRun, C=Couplg, S=SwgChk, G=GatVlv, X= X, Y=

The maximum velocity of water flow occurs in pipe 1 at 6.07 ft/s with 1 sprinkler flowing.

The maximum velocity of water flow occurs in pipe 2 at 31.43 ft/s with 2 sprinklers flowing.

#### PIPE FITTINGS TABLE

Pipe Table Name: standard.npt

PAGE: B MATERIAL: BlazeMaster HWC: 150

Diameter (in)	Equivalent Fitting Lengths in Feet										
	E	L	B	R	C	S	G	X	Y	Z	
	45 Ell	90 Ell	TeeBch	TeeRun	Couplg	SwgChk	GatVlv	X	Y	Z	
0.874	1.00	7.00	3.00	1.00	1.00	5.00	2.00	0.00	0.00	0.00	
1.101	1.00	7.00	5.00	1.00	1.00	8.00	2.00	0.00	0.00	0.00	

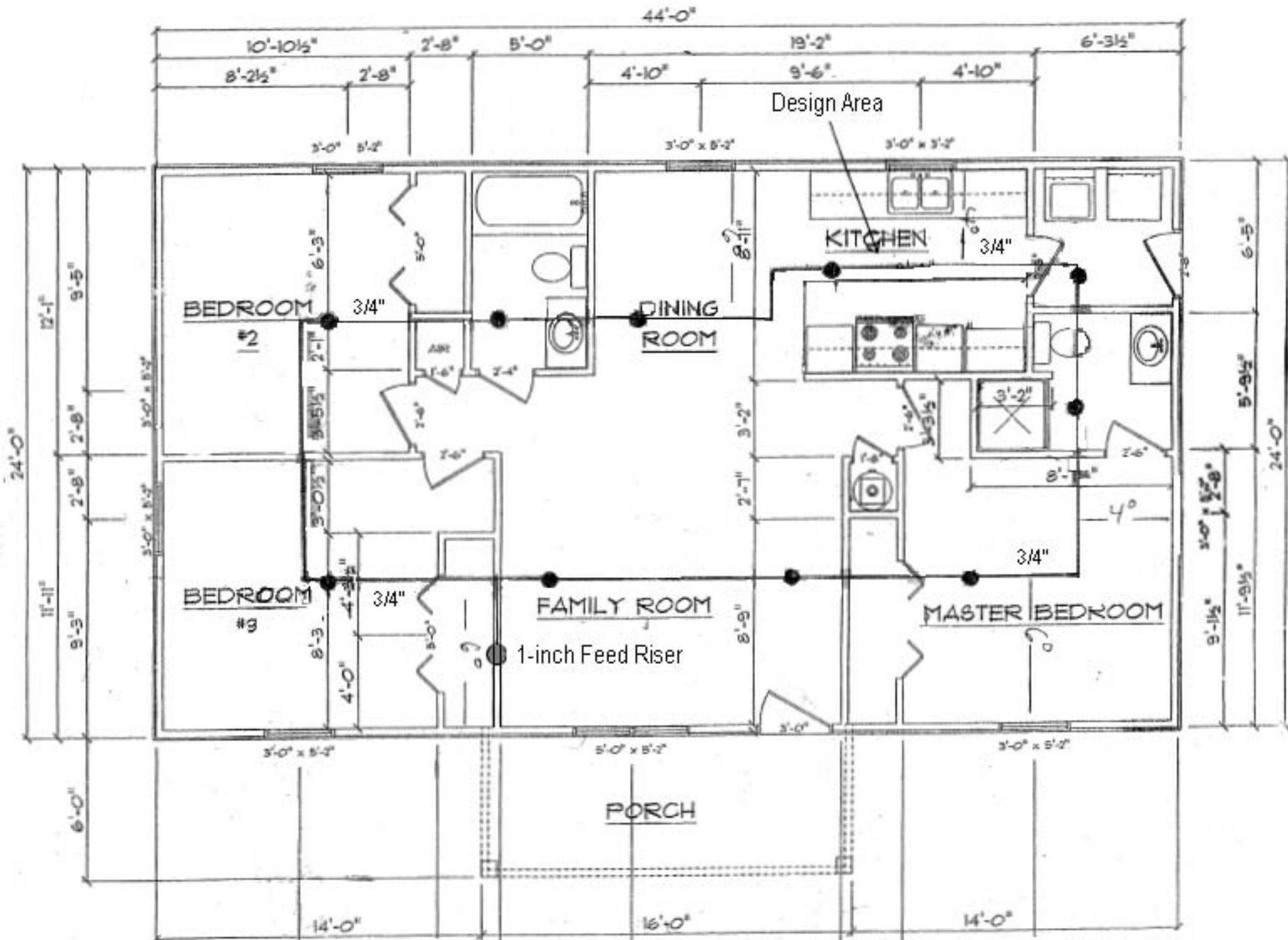
A negative value for flow rate indicates the direction of flow is from the second pipe no

A Fixed Pressure Loss Device calculates as a positive friction loss

A Fire Pump calculates as a negative friction loss

Sprinkler system has been hydraulically calculated with the HASS HOUSE 2.7 computer program (License No. R901199914) to provide an average imbalance of 0.010 gpm at each node and a maximum imbalance of 0.01 gpm with one sprinkler flowing, and 0.010 gpm at each node and maximum imbalance of 0.07 gpm with 2 sprinklers flowing in accordance with NFPA 13 and 13D or 13R.

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Sample 13D Sprinkler System Drawing for Habitat for Humanity Home  
 Layout may vary depending upon floor layout