

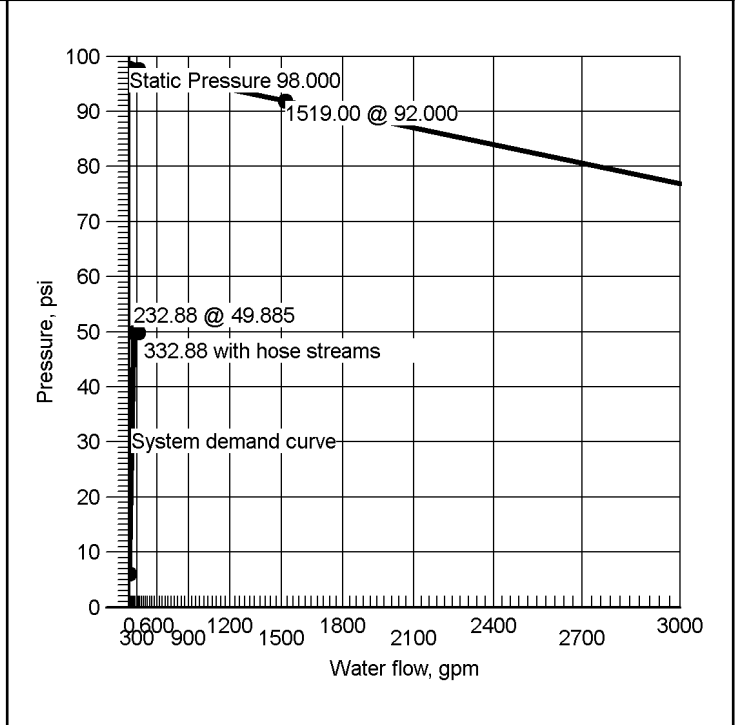
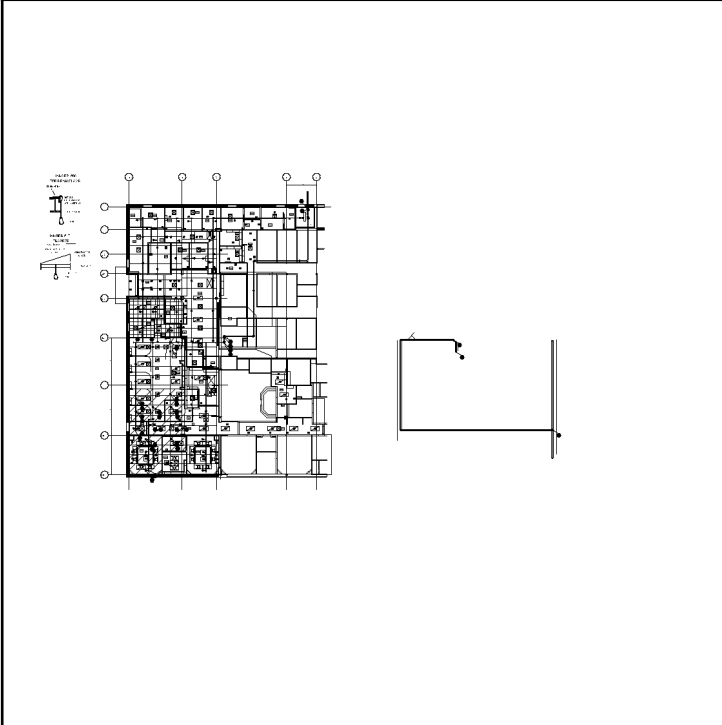


Job	
Job Number 131	Design Engineer Comprehensive FP
Job Name: Eyecare Medical Group	Phone 603-289-0490 FAX
Address 1 53 Sewall St	State Certification/License Number
Address 2 Portland, ME	AHJ
Address 3	Job Site/Building

System	
Density 0.100gpm/ft²	Area of Application 904.00ft² (Actual 909.32ft²)
Most Demanding Sprinkler Data 5.6 K-Factor 19.60 at 12.250	Hose Streams 100.00
Coverage Per Sprinkler 196.00ft²	Number Of Sprinklers Calculated 11
System Pressure Demand 49.885	System Flow Demand 232.88
Total Demand 332.88 @ 49.885	Pressure Result +47.753 (48.9%)

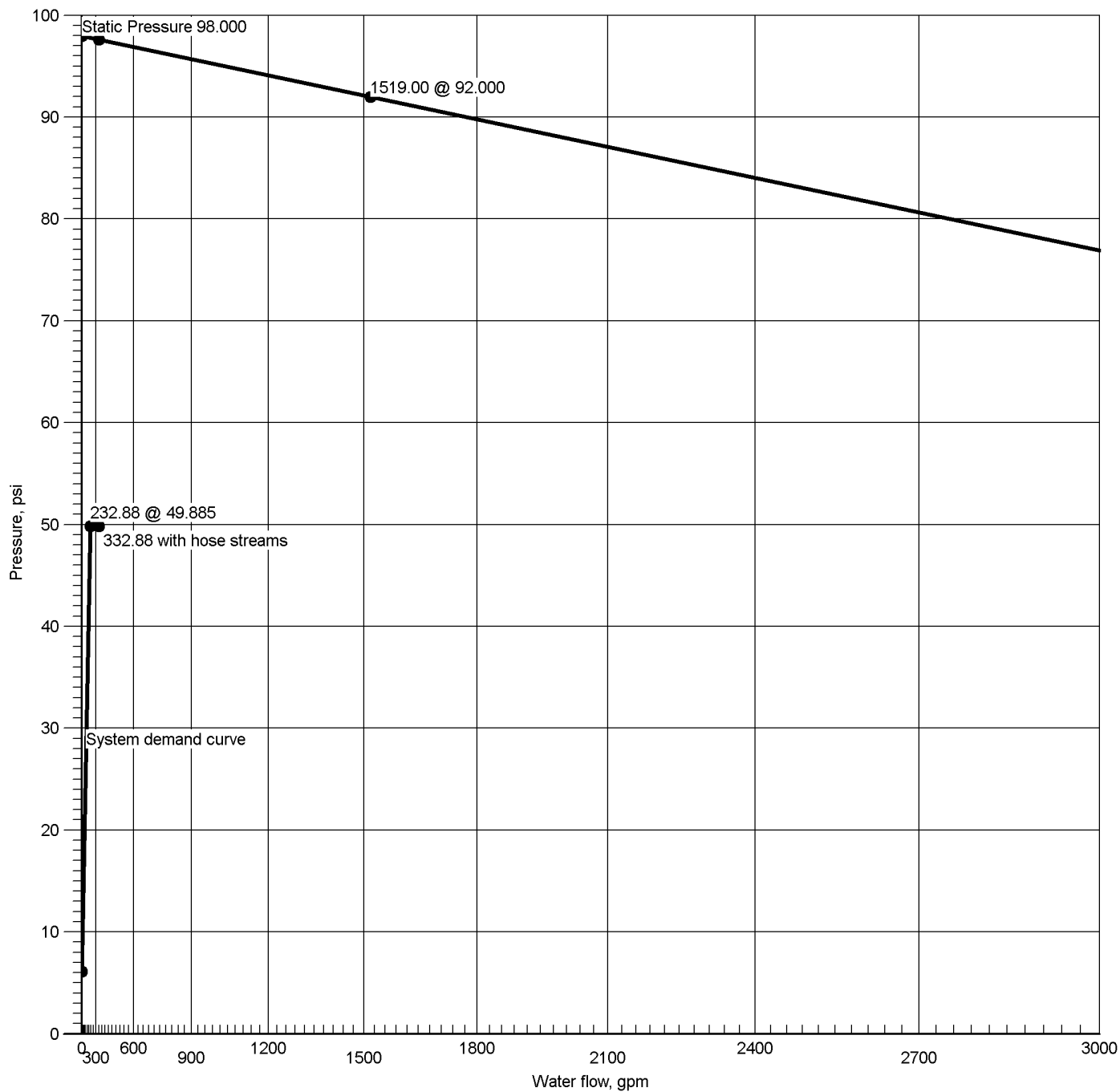
Supplies						Check Point Gauges			
<u>Node</u>	<u>Name</u>	<u>Flow(gpm)</u>	<u>Hose Flow(gpm)</u>	<u>Static(psi)</u>	<u>Residual(psi)</u>	<u>Identifier</u>	<u>Pressure(psi)</u>	<u>K-Factor(K)</u>	<u>Flow(gpm)</u>
1	Water Supply	1519.00	100.00	98.000	92.000	BOR	35.205	39.25	232.88

CFP131-FP-Plan-v2.cad Water Supply at Node 1 (1519.00, 100.00, 98.000, 92.000)





Water Supply at Node 1



Hydraulic Graph
Water Supply at Node 1

Static: Pressure
98.000

Residual: Pressure
92.000 @ 1519.00

Available Pressure at Time of Test
97.638 @ 332.88

System Demand
49.885 @ 232.88

System Demand (Including Hose Allowance at Source)
49.885 @ 332.88

Test Conducted By
Water Dept

Date of Test
9/13/2011

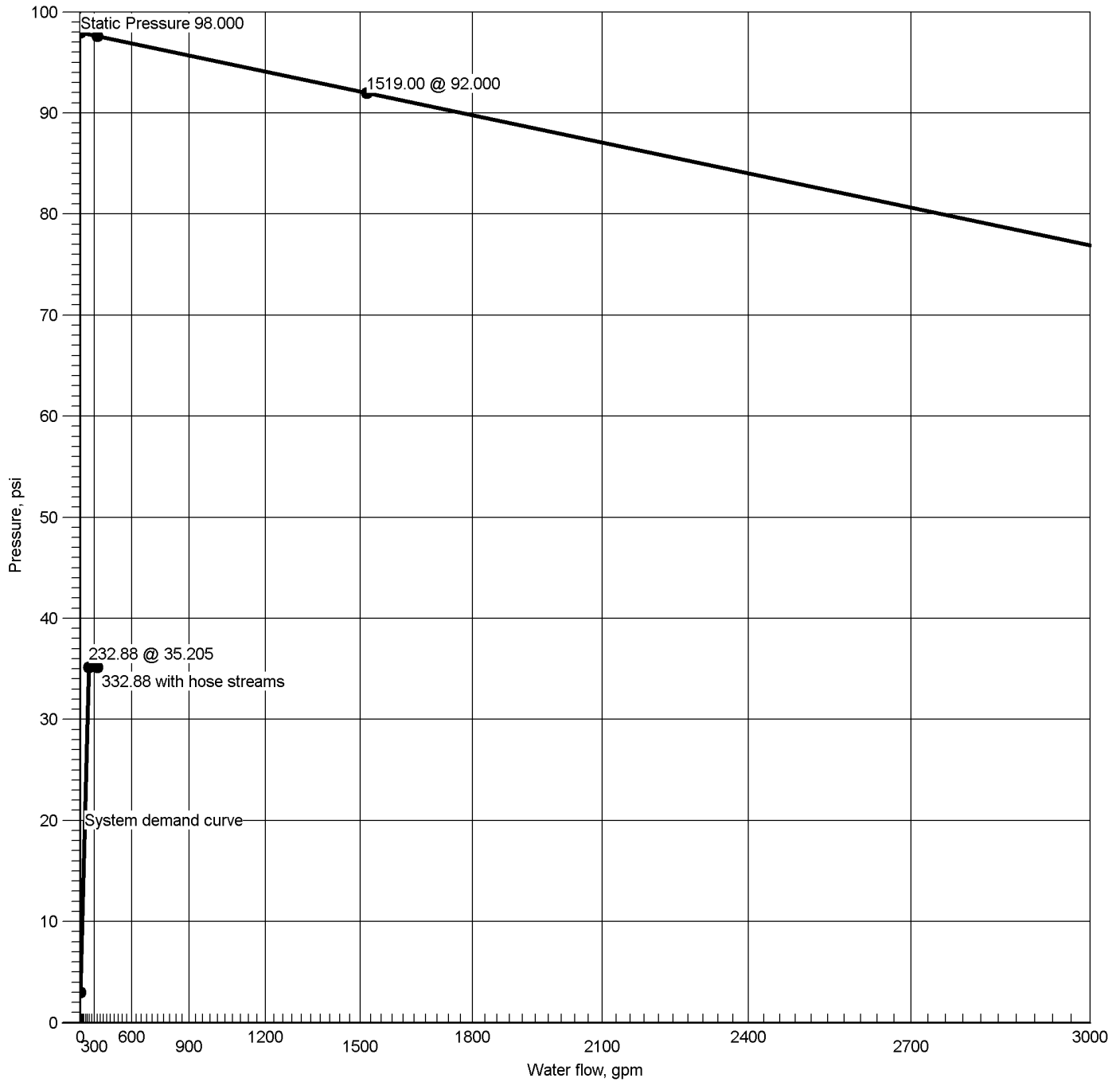
Hydrant Numbers
HYD01670

Hydrant Elevation
0 FT

Location
Sewall St



BOR



Hydraulic Graph

BOR

Static: Pressure

N/A

Residual: Pressure

N/A

Available Pressure at Time of Test

N/A

System Demand

35.205 @ 232.88

System Demand (Including Hose Allowance at Source)

35.205 @ N/A



Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)	Density (gpm/ft ²)
Sprinkler	101	20.56	19.60	5.6	13.475	0.105gpm/ft ²
Sprinkler	102	21.32	19.60	5.6	14.495	0.109gpm/ft ²
Sprinkler	103	21.08	19.60	5.6	14.175	0.108gpm/ft ²
Sprinkler	104	21.89	19.60	5.6	15.277	0.112gpm/ft ²
Sprinkler	105	19.85	19.60	5.6	12.560	0.101gpm/ft ²
Sprinkler	106	21.27	19.60	5.6	14.431	0.109gpm/ft ²
Sprinkler	107	19.73	19.60	5.6	12.416	0.101gpm/ft ²
➔ Sprinkler	108	19.60	19.60	5.6	12.250	0.100gpm/ft²
Sprinkler	109	22.58	19.60	5.6	16.251	0.115gpm/ft ²
Sprinkler	110	22.80	19.60	5.6	16.572	0.116gpm/ft ²
Sprinkler	111	22.20	19.60	5.6	15.721	0.113gpm/ft ²

➔ Most Demanding Sprinkler Data



Hydraulic Analysis

Job Number: 131 - Offices
Report Description: Light Hazard

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream						Total Length	
Route 1							
DR	1.0490	19.60	7.28	120	0.125357	3'-6½"	Pf 1.323
108	9'-0¼"	19.60	5.6	12.250	Sprinkler,	7'-0"	Pe -0.930
18	11'-2"			12.642	E(2'-0"), PO(5'-0)	10'-6½"	Pv
BL	1.6820	19.60	2.83	120	0.012576	14'-6"	Pf 0.182
18	11'-2"			12.642			Pe
17	11'-2"			12.825		14'-6"	Pv
BL	1.6820	39.33	5.68	120	0.045621	7'-0¼"	Pf 0.321
17	11'-2"	19.73		12.825	Flow (q) from Route 2		Pe
16	11'-2"			13.145		7'-0¼"	Pv
BL	1.6820	59.18	8.54	120	0.097136	9'-11¼"	Pf 1.446
16	11'-2"	19.85		13.145	Flow (q) from Route 3	4'-11¼"	Pe
15	11'-2"			14.591	2LtE(2'-5¼")	14'-10¾"	Pv
BL	1.6820	80.45	11.62	120	0.171444	30'-2"	Pf 6.869
15	11'-2"	21.27		14.591	Flow (q) from Route 6	9'-10¾"	Pe
19	11'-2"			21.461	PO(9'-10¾")	40'-0¾"	Pv
CM	2.6350	148.03	8.71	120	0.059509	8'-0"	Pf 0.476
19	11'-2"	67.58		21.461	Flow (q) from Route 9		Pe
14	11'-2"			21.937		8'-0"	Pv
CM	2.6350	232.88	13.70	120	0.137604	25'-1¼"	Pf 4.211
14	11'-2"	84.85		21.937	Flow (q) from Route 4	5'-6"	Pe 0.000
7	11'-2"			26.148	LtE(5'-6)	30'-7¼"	Pv
FR	2.6350	232.88	13.70	120	0.137604	7'-10½"	Pf 5.050
7	11'-2"			26.148		28'-10"	Pe 3.667
144	2'-8½"			34.865	CV(19'-2¼"), BV(9'-7¼")	36'-8½"	Pv
DY	4.2600	232.88	5.24	120	0.013262	0'-0"	Pf 0.105
144	2'-8½"			34.865		7'-10¾"	Pe 0.235
6	2'-2"			35.205	LtE(7'-10¾"), BOR	7'-10¾"	Pv
CM	4.2600	232.88	5.24	120	0.013262	2'-9¼"	Pf 0.142
6	2'-2"			35.205		7'-10¾"	Pe
9	2'-2"			35.346	LtE(7'-10¾")	10'-8¾"	Pv
FR	4.2600	232.88	5.24	120	0.013262	9'-0"	Pf 0.224
9	2'-2"			35.346		7'-10¾"	Pe -3.902
8	11'-2"			31.669	LtE(7'-10¾")	16'-10¾"	Pv
CM	4.2600	232.88	5.24	120	0.013262	102'-4¾"	Pf 10.830
8	11'-2"			31.669		92'-2"	Pe 3.902
4	2'-2"			46.400	6LtE(7'-10¾"), CV(28'-11½"), BV(15'-9½"), BFP(-8.250)	194'-6¾"	Pv
FR	6.0900	232.88	2.56	150	0.001540	7'-0"	Pf 0.082
4	2'-2"			46.400		46'-2½"	Pe 3.035
5	-4'-10"			49.517	T(46'-2½")	53'-2½"	Pv
CM	6.3570	232.88	2.35	120	0.001888	0'-0"	Pf 0.017
5	-4'-10"			49.517		8'-9½"	Pe 0.072
2	-5'-0"			49.606	EE(8'-9½")	8'-9½"	Pv
UG	6.4000	232.88	2.32	150	0.001209	51'-8¼"	Pf 0.096
2	-5'-0"			49.606		27'-5½"	Pe 0.000
3	-5'-0"			49.702	2EE(13'-8¾")	79'-2"	Pv
UG	8.5500	232.88	1.30	150	0.000295	454'-5"	Pf 0.183
3	-5'-0"			49.702		166'-10"	Pe
1	-5'-0"			49.885	2E(38'-0¼"), PIV(8'-5¼"), GV(8'-5¼"), S, T(73'-11)	621'-2¾"	Pv
		100.00			Hose Allowance At Source		
1		332.88					
Route 2							
DR	1.0490	19.73	7.33	120	0.126926	3'-6½"	Pf 1.339
107	9'-0¼"	19.73	5.6	12.416	Sprinkler,	7'-0"	Pe -0.930
17	11'-2"			12.825	E(2'-0"), PO(5'-0)	10'-6½"	Pv
Route 3							
DR	1.0490	19.85	7.37	120	0.128285	4'-9¾"	Pf 1.516
105	9'-0¼"	19.85	5.6	12.560	Sprinkler,	7'-0"	Pe -0.930
16	11'-2"			13.145	E(2'-0"), PO(5'-0)	11'-9¾"	Pv
Route 4							
DR	1.0490	20.56	7.63	120	0.136908	6'-9¾"	Pf 1.892
101	9'-0¼"	20.56	5.6	13.475	Sprinkler,	7'-0"	Pe -0.930
10	11'-2"			14.436	E(2'-0"), PO(5'-0)	13'-9¾"	Pv
BL	1.6820	41.64	6.01	120	0.050696	7'-11¼"	Pf 0.402
10	11'-2"	21.08		14.436	Flow (q) from Route 5		Pe
12	11'-2"			14.838		7'-11¼"	Pv
BL	1.6820	62.96	9.09	120	0.108932	6'-0"	Pf 0.654
12	11'-2"	21.32		14.838	Flow (q) from Route 7		Pe
13	11'-2"			15.492		6'-0"	Pv



Hydraulic Analysis

Job Number: 131 - Offices
Report Description: Light Hazard

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream						Total Length	
BL	1.6820	84.85	12.25	120	0.189178	24'-2"	Pf 6.445
13	11'-2"	21.89		15.492	Flow (q) from Route 8	9'-10 3/4"	Pe
14	11'-2"			21.937	PO(9'-10 3/4")	34'-0"	Pv
Route 5							
DR	1.0490	21.08	7.83	120	0.143474	3'-7 3/4"	Pf 1.527
103	8'-0 1/4"	21.08	5.6	14.175	Sprinkler,	7'-0"	Pe -1.364
11	11'-2"			14.338	E(2'-0"), PO(5'-0")	10'-7 3/4"	Pv
BL	1.6820	21.08	3.04	120	0.014394	6'-9 1/2"	Pf 0.098
11	11'-2"			14.338			Pe
10	11'-2"			14.436		6'-9 1/2"	Pv
Route 6							
DR	1.0490	21.27	7.90	120	0.145876	1'-11 1/4"	Pf 1.018
106	9'-2 1/4"	21.27	5.6	14.431	Sprinkler,	5'-0"	Pe -0.858
15	11'-2"			14.591	PO(5'-0")	6'-11 1/4"	Pv
Route 7							
DR	1.0490	21.32	7.91	120	0.146469	3'-2"	Pf 1.491
102	8'-6 1/4"	21.32	5.6	14.495	Sprinkler,	7'-0"	Pe -1.147
12	11'-2"			14.838	E(2'-0"), PO(5'-0")	10'-2"	Pv
Route 8							
DR	1.0490	21.89	8.13	120	0.153765	1'-11 1/4"	Pf 1.073
104	9'-2 1/4"	21.89	5.6	15.277	Sprinkler,	5'-0"	Pe -0.858
13	11'-2"			15.492	PO(5'-0")	6'-11 1/4"	Pv
Route 9							
DR	1.0490	22.20	8.24	120	0.157896	3'-2 1/4"	Pf 1.607
111	9'-0 1/4"	22.20	5.6	15.721	Sprinkler,	7'-0"	Pe -0.930
20	11'-2"			16.398	E(2'-0"), PO(5'-0")	10'-2 1/4"	Pv
BL	1.6820	22.20	3.21	120	0.015841	7'-11 1/2"	Pf 0.126
20	11'-2"			16.398			Pe
21	11'-2"			16.524		7'-11 1/2"	Pv
BL	1.6820	44.78	6.47	120	0.057992	5'-11 1/4"	Pf 0.347
21	11'-2"	22.58		16.524	Flow (q) from Route 10		Pe
22	11'-2"			16.871		5'-11 1/4"	Pv
BL	1.6820	67.58	9.76	120	0.124163	26'-2"	Pf 4.478
22	11'-2"	22.80		16.871	Flow (q) from Route 11	9'-10 3/4"	Pe
23	11'-2"			21.349	PO(9'-10 3/4")	36'-0"	Pv
CM	2.6350	67.58	3.98	120	0.013950	8'-0"	Pf 0.112
23	11'-2"			21.349			Pe
19	11'-2"			21.461		8'-0"	Pv
Route 10							
DR	1.0490	22.58	8.38	120	0.162815	2'-0"	Pf 1.140
109	9'-2"	22.58	5.6	16.251	Sprinkler,	5'-0"	Pe -0.867
21	11'-2"			16.524	PO(5'-0")	7'-0"	Pv
Route 11							
DR	1.0490	22.80	8.46	120	0.165782	1'-11 1/4"	Pf 1.157
110	9'-2 1/4"	22.80	5.6	16.572	Sprinkler,	5'-0"	Pe -0.858
22	11'-2"			16.871	PO(5'-0")	6'-11 1/4"	Pv

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

C Value Multiplier

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

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



Hydraulic Analysis

Job Number: 131 - Offices
Report Description: Light Hazard

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
DeIV	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
LiE	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



Job

Eyecare Medical Group
53 Sewall St
Portland, ME

Design Basis

Occupancy:	Light Hazard
Total Sprinklers:	79
Number Of Sprinklers Calculated:	11
K-Factor:	5.6
Orifice Size:	0.5
Design Density:	0.100gpm/ft ²
Average Density:	0.256gpm/ft ²
Area of Application:	904.00ft ² (Actual 909.32ft ²)

Demand At Base Of Riser (BOR)

Total Demand Flow(gpm):	232.88
Pressure(psi):	35.205

Water Supply Information At Time Of Design

Static Pressure(psi):	98.000
Residual Pressure(psi):	92.000
Supply Flow(gpm):	1519.00
Total Demand Flow(gpm):	332.88
Total Demand Pressure(psi):	49.885