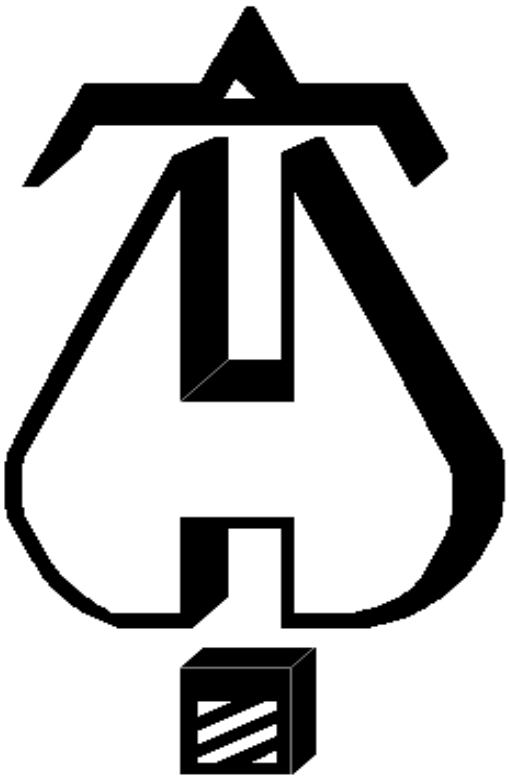


. . . Fire Protection by Computer Design

Denali Fire protection, Inc.
270 Tiger Hill Road
Your Street Address 2
Oxford, Maine 04270
207-539-4226

Job Name	:	W.B. MASON NEW LOADING DOCK ADDITION
Building	:	STEEL STRUCTURE
Location	:	106 PINE TREE INDUSTRIAL PARKWAY PORTLAND, MAINE
System	:	1
Contract	:	C6-10
Data File	:	1-C610.WXF

Hydraulic Design Information Sheet

Name - W.B. MASON Date - 02/15/10
Location - 106 PINE TREE INDUSTRIAL PARKWAY PORTLAND, MAINE
Building - STEEL STRUCTURE System No. - 1
Contractor - DENALI FIRE PROTECTION, INC. Contract No. - C6-10
Calculated By - CKD Drawing No. - 3
Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - VARIES
Occupancy - LOADING DOCK

SYSTEM DESIGN

(X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 (X) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C (X) Figure 11.2.3.1.1 Curve OH II
Other AREA REDUCED PER NFPA 13 SECTION 11.2.3.2.3.1

Specific Ruling	Made By	Date

Area of Sprinkler Operation	- 1060	System Type	Sprinkler/Nozzle
Density	- .2	(X) Wet	Make VICTAULIC
Area Per Sprinkler	- 117	( ) Dry	Model V2704
Elevation at Highest Outlet	- 114.83	( ) Deluge	Size 1/2"
Hose Allowance - Inside	-	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.155
Hose Allowance - Outside	-		

Note

Calculation Summary — Flow Required - 508.661 Press Required - 43.522 AT TEST
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:
Date of Test	- 06/14/93			Cap. -
Time of Test	-	Rated Cap.-		Elev.-
Static Press	- 75	@ Press	-	
Residual Press	- 66	Elev.	-	Well
Flow	- 1125			Proof Flow
Elevation	- 100.0			

Location - 100'-0" FROM THE BUILDING

Source of Information - PORTLAND WATER DISTRICT

STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non
( ) Mult. Row		( ) Open Shelf	

Flue Spacing	Clearance:Storage to Ceiling
Longitudinal	Transverse

Horizontal Barriers Provided:

Water Supply Curve (C)

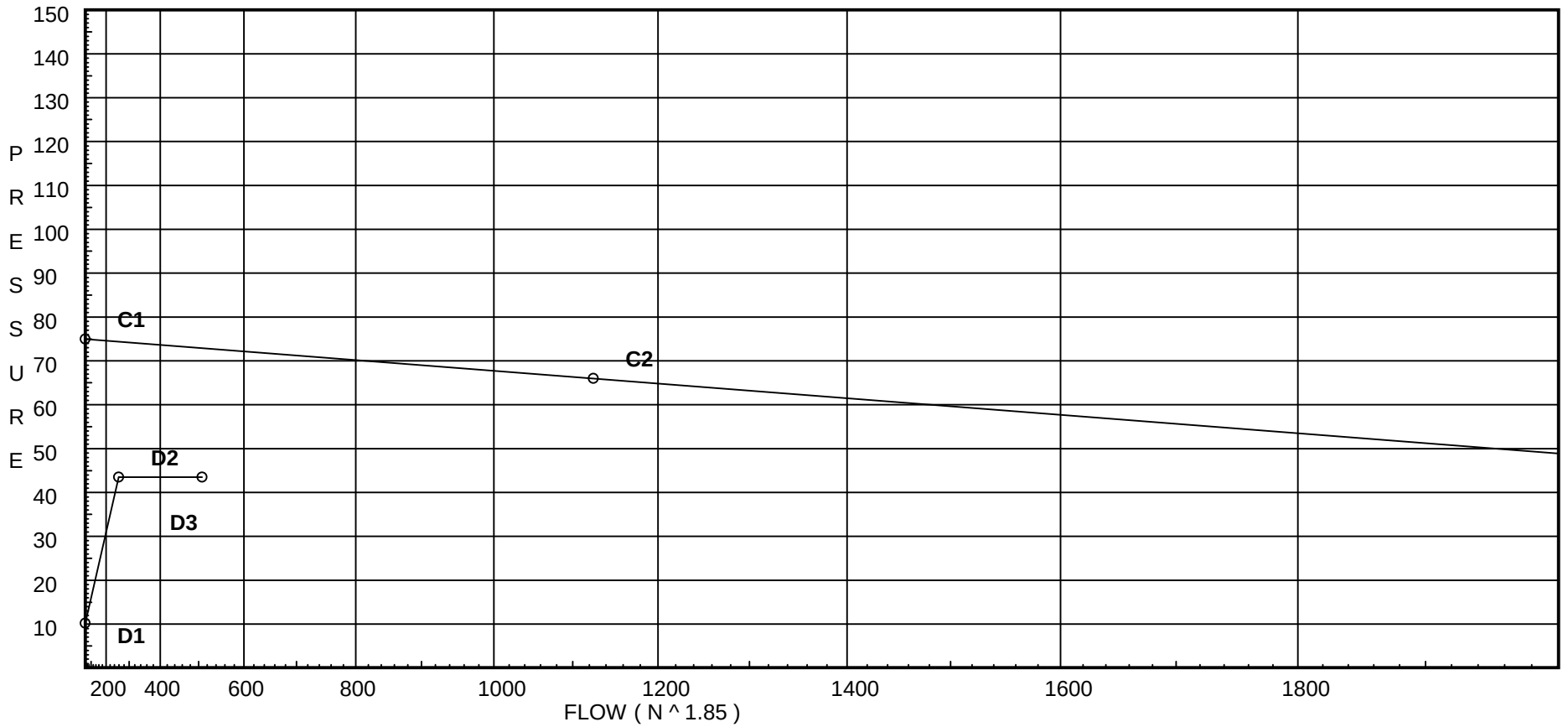
Denali Fire protection, Inc.
W.B. MASON NEW LOADING DOCK ADDITION

Date 02/15/10

City Water Supply:
- C1 - Static Pressure : 75
- C2 - Residual Pressure: 66
- C2 - Residual Flow : 1125

Demand:

D1 - Elevation	:	10.178
D2 - System Flow	:	258.661
D2 - System Pressure	:	43.522
Hose (Adj City)	:	_____
Hose (Demand)	:	250
D3 - System Demand	:	508.661
Safety Margin	:	29.405



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
A	Generic Alarm Valve	0	0	0	0	0	0	7.7	21.5	0	17	17	27	29	0	0	0	0	0	0	0
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	123.5	5.6	19.6	na	24.79	0.2	117	7.0
2	123.5	5.6	17.46	na	23.4	0.2	117	7.0
2A	123.5		19.69	na				
3	123.5	5.6	19.81	na	24.92	0.2	117	7.0
4	123.5	5.6	20.17	na	25.15	0.2	117	7.0
5	123.5	5.6	20.79	na	25.53	0.2	117	7.0
6	123.5	5.6	21.74	na	26.11	0.2	117	7.0
7	123.5	5.6	23.32	na	27.04	0.2	117	7.0
8	123.5	5.6	23.37	na	27.07	0.2	117	7.0
9	123.5	5.6	23.58	na	27.19	0.2	117	7.0
10	123.5	5.6	24.02	na	27.45	0.2	117	7.0
A	123.5		26.65	na				
B	123.5		26.73	na				
C	123.5		27.74	na				
D	123.5		32.4	na				
TI	123.5		32.87	na				
BASE	101.0		42.75	na				
TEST	100.0		43.52	na	250.0			

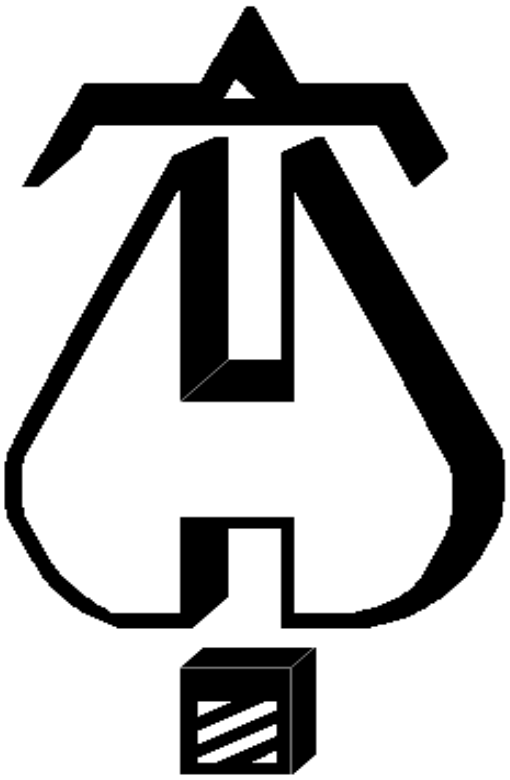
The maximum velocity is 13.16 and it occurs in the pipe between nodes 6 and A

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
1	24.79	2.157	1T	12.307	2.370	19.601		K Factor = 5.60
to		120		0.0	12.307	0.0		
2A	24.79	0.0058		0.0	14.677	0.085		Vel = 2.18
	0.0							
	24.79					19.686		K Factor = 5.59
2	23.40	1.049	1E	2.0	5.790	17.460		K Factor = 5.60
to		120	1T	5.0	7.000	0.0		
2A	23.4	0.1740		0.0	12.790	2.226		Vel = 8.69
2A	24.79	2.157		0.0	6.040	19.686		
to		120		0.0	0.0	0.0		
3	48.19	0.0197		0.0	6.040	0.119		Vel = 4.23
3	24.92	2.157		0.0	8.420	19.805		K Factor = 5.60
to		120		0.0	0.0	0.0		
4	73.11	0.0429		0.0	8.420	0.361		Vel = 6.42
4	25.15	2.157		0.0	8.420	20.166		K Factor = 5.60
to		120		0.0	0.0	0.0		
5	98.26	0.0739		0.0	8.420	0.622		Vel = 8.63
5	25.53	2.157		0.0	8.420	20.788		K Factor = 5.60
to		120		0.0	0.0	0.0		
6	123.79	0.1133		0.0	8.420	0.954		Vel = 10.87
6	26.12	2.157	1T	12.307	18.080	21.742		K Factor = 5.60
to		120		0.0	12.307	0.0		
A	149.91	0.1615		0.0	30.387	4.906		Vel = 13.16
	0.0							
	149.91					26.648		K Factor = 29.04
7	27.04	2.157		0.0	8.420	23.318		K Factor = 5.60
to		120		0.0	0.0	0.0		
8	27.04	0.0068		0.0	8.420	0.057		Vel = 2.37
8	27.08	2.157		0.0	8.420	23.375		K Factor = 5.60
to		120		0.0	0.0	0.0		
9	54.12	0.0245		0.0	8.420	0.206		Vel = 4.75
9	27.19	2.157		0.0	8.420	23.581		K Factor = 5.60
to		120		0.0	0.0	0.0		
10	81.31	0.0521		0.0	8.420	0.439		Vel = 7.14
10	27.45	2.157	1T	12.307	18.080	24.020		K Factor = 5.60
to		120		0.0	12.307	0.0		
B	108.76	0.0891		0.0	30.387	2.709		Vel = 9.55
	0.0							
	108.76					26.729		K Factor = 21.04
A	149.91	4.26		0.0	13.790	26.648		
to		120		0.0	0.0	0.0		
B	149.91	0.0059		0.0	13.790	0.081		Vel = 3.37
B	108.75	4.26	1T	26.334	36.330	26.729		
to		120		0.0	26.334	0.0		
C	258.66	0.0161		0.0	62.664	1.009		Vel = 5.82
C	0.0	4.26	4L	31.601	231.500	27.738		
to		120	1T	26.334	57.935	0.0		
D	258.66	0.0161		0.0	289.435	4.662		Vel = 5.82

Final Calculations - Standard

Denali Fire protection, Inc. Page 6
W.B. MASON NEW LOADING DOCK ADDITION Date 02/15/10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
D	0.0	6.357	2L	22.632	181.870	32.400		
to		120		0.0	22.632	0.0		
TI	258.66	0.0023		0.0	204.502	0.469		Vel = 2.61
TI	0.0	6.357	1A	33.948	14.000	32.869		
to		120	1B	12.573	46.521	9.745		
BASE	258.66	0.0023		0.0	60.521	0.138		Vel = 2.61
BASE	0.0	6.16	1E	20.084	100.000	42.752		
to		140	1G	4.304	67.425	0.433		
TEST	258.66	0.0020	1T	43.037	167.425	0.337		Vel = 2.78
	250.00							Qa = 250.00
	508.66					43.522		K Factor = 77.10



. . . Fire Protection by Computer Design

Denali Fire protection, Inc.
270 Tiger Hill Road
Your Street Address 2
Oxford, Maine 04270
207-539-4226

Job Name	:	W.B. MASON NEW LOADING DOCK ADDITION
Building	:	STEEL STRUCTURE
Location	:	106 PINE TREE INDUSTRIAL PARKWAY PORTLAND, MAINE
System	:	1
Contract	:	C6-10
Data File	:	2-C610.WXF

Hydraulic Design Information Sheet

Name - W.B. MASON Date - 02/15/10
Location - 106 PINE TREE INDUSTRIAL PARKWAY PORTLAND, MAINE
Building - STEEL STRUCTURE System No. - 1
Contractor - DENALI FIRE PROTECTION, INC. Contract No. - C6-10
Calculated By - CKD Drawing No. - 3
Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - 10'-0"
Occupancy - SALES FLOOR

SYSTEM DESIGN

(X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 (X) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C (X) Figure 11.2.3.1.1 Curve OH II
Other AREA REDUCED PER NFPA 13 SECTION 11.2.3.2.3.1

Specific Ruling	Made By	Date

Area of Sprinkler Operation - 944	System Type	Sprinkler/Nozzle
Density - .2	(X) Wet	Make VICTAULIC
Area Per Sprinkler - 111	( ) Dry	Model V2708
Elevation at Highest Outlet - 123.46	( ) Deluge	Size 1/2"
Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	( ) Other	Temp.Rat.155
Hose Allowance - Outside -		

Note

Calculation Summary: Flow Required - 484.333 Press Required - 53.288 AT TEST
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 06/14/93		Cap. -
Time of Test -	Rated Cap.-	Elev.-
Static Press - 75	@ Press -	
Residual Press - 66	Elev. -	Well
Flow - 1125		Proof Flow
Elevation - 100.0		

Location - 100'-0" FROM THE BUILDING

Source of Information - PORTLAND WATER DISTRICT

COMMODITY STORAGE

Commodity	Class	Location
Storage Ht.	Area	Aisle W.

Storage Method: Solid Piled % Palletized % Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non
( ) Mult. Row		( ) Open Shelf	

RACK STORAGE

Flue Spacing	Clearance:Storage to Ceiling
Longitudinal	Transverse

Horizontal Barriers Provided:

Water Supply Curve (C)

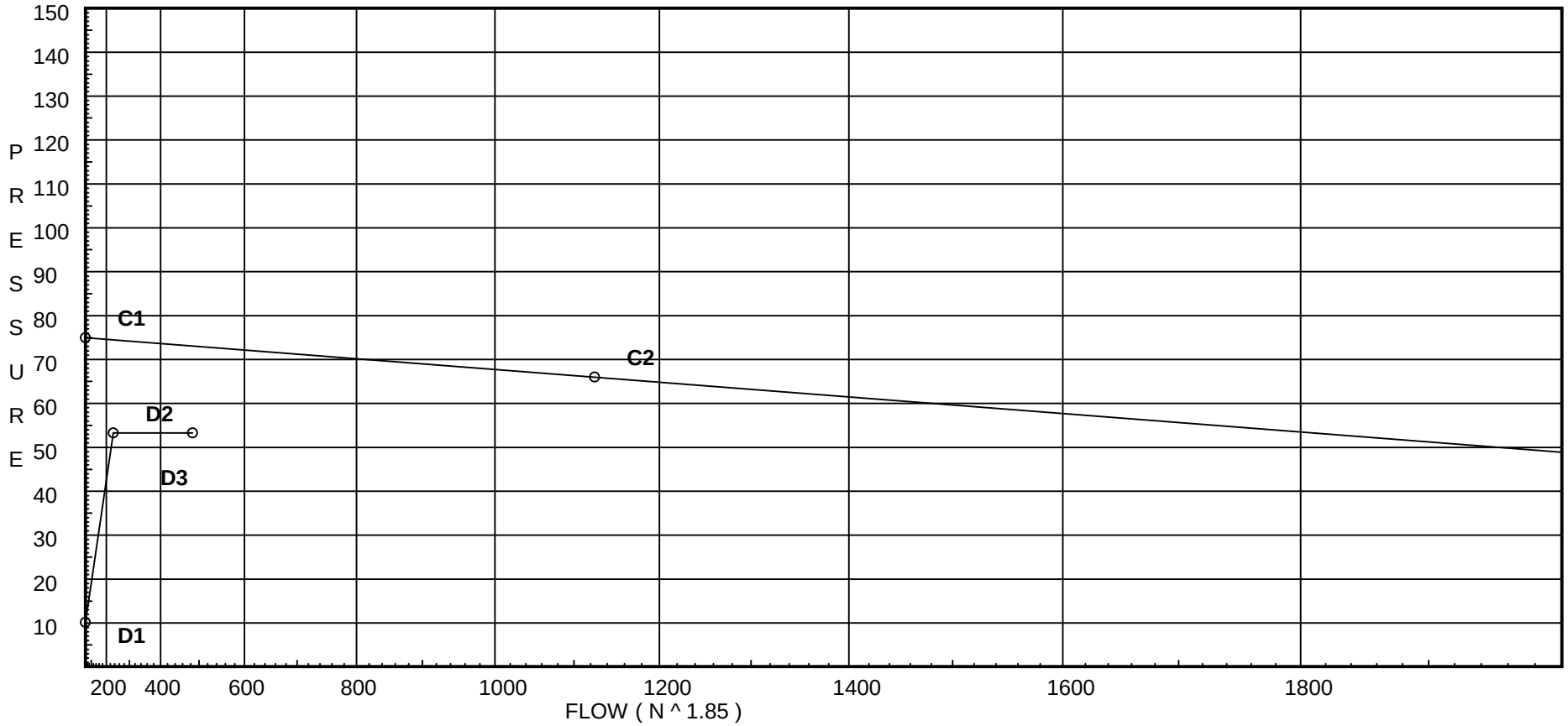
Denali Fire protection, Inc.
W.B. MASON NEW LOADING DOCK ADDITION

Date 02/15/10

City Water Supply:
- C1 - Static Pressure : 75
- C2 - Residual Pressure: 66
- C2 - Residual Flow : 1125

Demand:

D1 - Elevation	:	10.161
D2 - System Flow	:	234.333
D2 - System Pressure	:	53.288
Hose (Adj City)	:	
Hose (Demand)	:	250
D3 - System Demand	:	484.333
Safety Margin	:	19.819



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
A	Generic Alarm Valve	0	0	0	0	0	0	7.7	21.5	0	17	17	27	29	0	0	0	0	0	0	0
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
D1	0.0	5.6	15.72	na	22.2	0.2	111	7.0
11	123.46	K = K @ L1	18.24	na	23.23			
12	123.46	K = K @ L1	18.35	na	23.3			
13	123.46	K = K @ L1	18.85	na	23.61			
14	123.46	K = K @ L1	19.91	na	24.27			
15	123.46	K = K @ L1	21.75	na	25.37			
16	123.46	K = K @ L1	16.66	na	22.2			
17	123.46	K = K @ L1	16.79	na	22.28			
18	123.46	K = K @ L1	17.25	na	22.59			
19	123.46	K = K @ L1	18.23	na	23.22			
20	123.46	K = K @ L1	19.93	na	24.28			
E	123.46		41.61	na				
F	123.46		41.65	na				
TOR	123.46		42.64	na				
TI	114.83		46.47	na				
BASE	101.0		52.57	na				
TEST	100.0		53.29	na	250.0			

The maximum velocity is 17.29 and it occurs in the pipe between nodes 15 and E

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
D1	22.20	1.049	1T	5.0	1.000	15.716		K Factor = 5.60
to		120		0.0	5.000	0.0		
L1	22.2	0.1578		0.0	6.000	0.947		Vel = 8.24
	0.0							
	22.20					16.663		K Factor = 5.44
11	23.23	1.682		0.0	6.000	18.244		K Factor @ node L1
to		120		0.0	0.0	0.0		
12	23.23	0.0173		0.0	6.000	0.104		Vel = 3.35
12	23.30	1.682		0.0	8.000	18.348		K Factor @ node L1
to		120		0.0	0.0	0.0		
13	46.53	0.0622		0.0	8.000	0.498		Vel = 6.72
13	23.61	1.682		0.0	8.000	18.846		K Factor @ node L1
to		120		0.0	0.0	0.0		
14	70.14	0.1330		0.0	8.000	1.064		Vel = 10.13
14	24.26	1.682		0.0	8.000	19.910		K Factor @ node L1
to		120		0.0	0.0	0.0		
15	94.4	0.2305		0.0	8.000	1.844		Vel = 13.63
15	25.37	1.682	1T	9.9	45.580	21.754		K Factor @ node L1
to		120		0.0	9.900	0.0		
E	119.77	0.3579		0.0	55.480	19.858		Vel = 17.29
	0.0							
	119.77					41.612		K Factor = 18.57
16	22.20	1.682		0.0	8.000	16.663		K Factor @ node L1
to		120		0.0	0.0	0.0		
17	22.2	0.0158		0.0	8.000	0.126		Vel = 3.21
17	22.28	1.682		0.0	8.000	16.789		K Factor @ node L1
to		120		0.0	0.0	0.0		
18	44.48	0.0574		0.0	8.000	0.459		Vel = 6.42
18	22.59	1.682		0.0	8.000	17.248		K Factor @ node L1
to		120		0.0	0.0	0.0		
19	67.07	0.1224		0.0	8.000	0.979		Vel = 9.68
19	23.22	1.682		0.0	8.000	18.227		K Factor @ node L1
to		120		0.0	0.0	0.0		
20	90.29	0.2122		0.0	8.000	1.698		Vel = 13.04
20	24.28	1.682	3L	7.425	48.580	19.925		K Factor @ node L1
to		120	1T	9.9	17.325	0.0		
F	114.57	0.3297		0.0	65.905	21.730		Vel = 16.54
	0.0							
	114.57					41.655		K Factor = 17.75
E	119.77	4.26		0.0	11.000	41.612		
to		120		0.0	0.0	0.0		
F	119.77	0.0039		0.0	11.000	0.043		Vel = 2.70
F	114.56	4.26	1L	7.9	65.580	41.655		
to		120		0.0	7.900	0.0		
TOR	234.33	0.0134		0.0	73.480	0.985		Vel = 5.27
TOR	0.0	6.357	1T	37.72	10.000	42.640		
to		120		0.0	37.720	3.738		
TI	234.33	0.0019		0.0	47.720	0.091		Vel = 2.37

Final Calculations - Standard

Denali Fire protection, Inc.
W.B. MASON NEW LOADING DOCK ADDITION

Date 02/15/10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
TI	0.0	6.357	1A	33.948	14.000	46.469				
to		120	1B	12.573	46.521	5.990				
BASE	234.33	0.0019		0.0	60.521	0.115		Vel = 2.37		
BASE	0.0	6.16	1E	20.084	100.000	52.574				
to		140	1G	4.304	67.425	0.433				
TEST	234.33	0.0017	1T	43.037	167.425	0.281		Vel = 2.52		
	250.00							Qa = 250.00		
	484.33					53.288		K Factor = 66.35		