

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND

BUILDING PERMIT

This is to certify that HIGH TECH FIRE PROTECTION
of PO Box 156, Minot, ME 04258

For installation at 180 HIGH ST
Marlborough Condos

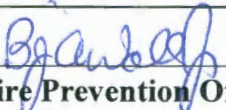
Job ID: 2011-10-2567-FAFS

CBL: 046-B-014-010

has permission to install Option 3 AUTOSPKR & MANUAL WET STANDPIPE
provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be


Fire Prevention Officer

(58)

Code Enforcement Officer / Plan Reviewer

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD**

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

Final Fire

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development
Penny St. Louis

Job ID: 2011-10-2567-FAFS
Install Option 3 AUTOSPKR &
MANUAL WET STANDPIPE

For installation at:
180 HIGH ST
Marlborough Condos

CBL: 046- B-014-010

Conditions of Approval:

Fire

The sprinkler system shall be installed in accordance with NFPA 101:31.3.5.9 and NFPA 13.

A sprinkler supervisory system shall be provided in accordance with NFPA 101, *Life Safety Code*, and NFPA 72, *National Fire Alarm and Signaling Code*.

Sprinkler protection shall be maintained. Where the system is to be shut down for maintenance or repair, the system shall be checked at the end of each day to insure the system has been placed back in service.

Fire department connections shall be 2 ½" NH. The Fire Department will require Knox locking caps on all Fire Department Connections on the exterior of the building.

System acceptance and commissioning must be coordinated with alarm and suppression system contractors and the Fire Department. Call 874-8703 to schedule.

Installation of a sprinkler or fire alarm system requires a Knox Box to be installed per city ordinance.

The Standpipe system shall be installed in accordance with NFPA 14.

This system is a manual wet standpipe. Each hose connection shall be provided with a conspicuous sign that reads "MANUAL STANDPIPE FOR FIRE DEPARTMENT USE ONLY." (14:5.4.2) Letters shall be red with a white background and shall be 2 ½" in height. (14:6.3.8.5.2)

The FDC shall have a signs complying with NFPA 13:8.17.2.4.7 and indicating PARTIAL AUTOSPKR & MANUAL STANDPIPE or other approved language.

Signed compliance letters will be required.

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No: 2011-10-2567-FAFS	Date Applied: 10/18/2011	CBL: 046- B-014-010	
Location of Construction: 180 HIGH ST	Owner Name: Marlborough Condo Association	Owner Address: 180 HIGH ST PORTLAND, ME 04101	Phone:
Business Name:	Contractor Name:	Contractor Address:	Phone:
Lessee/Buyer's Name:	Phone:	Permit Type: FAFS	Zone: B-3
Past Use: Thirty six (36) residential condos	Proposed Use: Same: 36 residential condos – to install fire suppression system in common areas and stair towers	Cost of Work: \$70,000.00	CEO District:
		Fire Dept: <input checked="" type="checkbox"/> Approved <i>w/ conditions</i> <input type="checkbox"/> Denied <input type="checkbox"/> N/A Signature: <i>Bjorn...</i> (50)	Inspection: Use Group: Type: Signature:
Proposed Project Description: water based fire suppression		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Gayle		Zoning Approval	

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules. 2. Building Permits do not include plumbing, septic or electrical work. 3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.	Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetlands <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan <input type="checkbox"/> Maj <input type="checkbox"/> Min <input type="checkbox"/> MM Date: <i>OV</i> <i>10/20/11</i>	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	Historic Preservation <input type="checkbox"/> Not in Dist or Landmark <input type="checkbox"/> Does not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date:
	CERTIFICATION		

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

2011 10 2569



Water-Based Fire Suppression System Permit

If you or the property owner owes real estate or property taxes or user charges on any property within the city, payment arrangements must be made before permits of any kind are accepted.

By Mail B-3
46 B 014

Installation address: 180 High Street CBL: _____

Exact location: (within structure) Common Areas and Stair Towers

CITY OF PORTLAND, MAINE
Department of Building Inspections

Original Receipt

Received from Oct 27 2011
 Location of Work Jessie Cap 180 High Street
 Cost of Construction \$ _____ Building Fee: _____
 Permit Fee \$ _____ Site Fee: _____
 Certificate of Occupancy Fee: _____
 Total: 530.00
 Building (IL) Plumbing (15) _____ Electrical (12) _____ Site Plan (12) _____
 Other _____
 CBL: 46 B 014
 Check #: 17840 Total Collected \$ 530.00

**No work is to be started until permit issued.
Please keep original receipt for your records.**

Taken by: [Signature]
 WHITE - Applicant's Copy
 YELLOW - Office Copy
 PINK - Permit Copy

Submit all information to the Building Inspections Department, 369 Congress Street, Room 515, Portland, Maine 04101.

Prior to acceptance of any fire protection system, a complete commissioning and acceptance test must be coordinated with all fire system contractors and the Fire Department, and proper documentation of such test(s) provided.
 All installation(s) must comply with NFPA and the Fire Department Technical Standard(s).

Applicant signature: [Signature] Date: 10/12/2011



... Fire Protection by Computer Design

HIGH TECH FIRE PROTECTION
84 HACKETT MILLS ROAD
POLAND, ME 04274
998-2551

Job Name : Third Floor Calc.
Building : Marlborough Condo
Location : 180 High Street
System : NFPA 101 #3
Contract : 060410-1
Data File : Third Floor Calc.WXF

Hydraulic Design Information Sheet

Name - Third Floor Calc. Date - 10/6/2011
 Location - 180 High Street
 Building - Marlborough Condo System No. - NFPA 101 #3
 Contractor - High Tech Fire Protection Contract No. - 060410-1
 Calculated By - Jeremy Foss Drawing No. - FP-1.1
 Construction: () Combustible (X) Non-Combustible Ceiling Height - 8'-0"
 Occupancy - Residential

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

M	Area of Sprinkler Operation - 448	System Type	Sprinkler/Nozzle
	Density - .1	(X) Wet	Make Globe
D	Area Per Sprinkler - 196	() Dry	Model GL5626
E	Elevation at Highest Outlet - 42	() Deluge	Size 1/2"
S	Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.155
G	Hose Allowance - Outside - 100		

N Note

Calculation Flow Required - 215 Press Required - 63
 Summary C-Factor Used: 150 Overhead 100 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 06/16/2009	Rated Cap.-	Cap. -
T	Time of Test -	@ Press -	Elev.-
E	Static Press - 69	Elev. -	
R	Residual Press - 64		Well
	Flow - 1061		Proof Flow
S	Elevation - 12		

U Location - Test Hydrant Located on Deering Avenue Approx. 650' from Site

P Source of Information - Portland Water District

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S R	() Double Row	() Slave Pallet	() Solid Shelf () Non
T A	() Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

E Horizontal Barriers Provided:

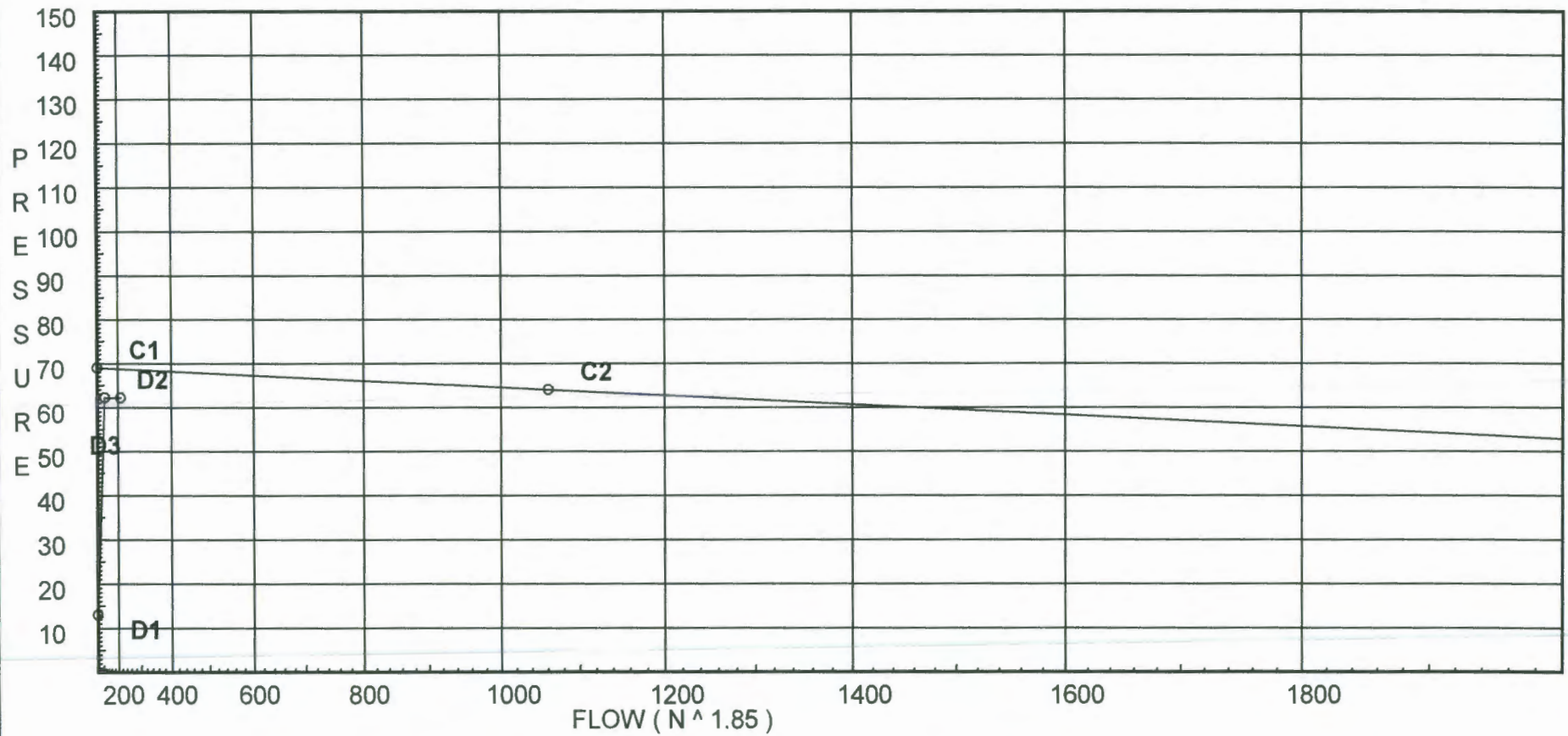
Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
Third Floor Calc.

Page 2
Date 10/6/2011

City Water Supply:
C1 - Static Pressure : 69
C2 - Residual Pressure: 64
C2 - Residual Flow : 1061

Demand:
D1 - Elevation : 12.993
D2 - System Flow : 114.687
D2 - System Pressure : 62.188
Hose (Adj City) :
Hose (Demand) : 100
D3 - System Demand : 214.687
Safety Margin : 6.552



Fittings Used Summary

HIGH TECH FIRE PROTECTION
Third Floor Calc.

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Date 10/6/2011

Fitting Legend		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
Abbrev.	Name																				
B	Generic Butterfly Valve	0	0	0	0	0	7	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	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N*	CPVC 90'Ell Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O*	CPVC Tee-Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
P*	CPVC 45' Elbow	1	1	1	2	2	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
R*	CPVC Coupling Tee-Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
S	Generic Swing Check Vlv	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
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
V	90' Ell Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

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

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

HIGH TECH FIRE PROTECTION
Third Floor Calc.

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Date 10/6/2011

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
401	42.0	5.6	12.25	na	19.6	0.1	196	7.0
B1	42.0		12.77	na				
402	42.0	5.6	14.61	na	21.4	0.1	196	7.0
403	42.0	5.6	14.62	na	21.41	0.1	196	7.0
B2	42.0		15.07	na				
404	42.0	5.6	16.69	na	22.88	0.1	196	7.0
B3	42.0		17.2	na				
405	42.0	5.6	27.56	na	29.4	0.1	196	7.0
B5	42.0		28.37	na				
B6	42.0		29.08	na				
B4	42.0		29.48	na				
B7	42.0		44.45	na				
A8	10.0		58.46	na				
A9	10.0		58.79	na				
TOR	2.0		62.45	na				
BOR	2.0		62.56	na				
BASE	0.0		66.98	na				
H1	0.0		67.03	na				
H2	8.0		63.58	na				
H3	12.0		62.16	na				
TEST	12.0		62.19	na	100.0			

The maximum velocity is 18.35 and it occurs in the pipe between nodes B4 and B7

Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
Third Floor Calc.

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Date 10/6/2011

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
401	19.60	1.101	1N 7.0	0.900	12.250			K Factor = 5.60	
to B1	19.6	150.0 0.0656	0.0	7.000 7.900	0.0 0.518			Vel = 6.60	
B1	0.0	1.101	1N 7.0	17.100	12.768				
to 402	19.6	150.0 0.0656	2P 2.0	11.000	0.0			Vel = 6.60	
402	21.40	1.101	1R 1.0	0.800	14.610			K Factor = 5.60	
to B2	41.0	150.0 0.2567	0.0	1.000 1.800	0.0 0.462			Vel = 13.82	
	0.0								
	41.00				15.072			K Factor = 10.56	
403	21.41	1.101	1O 5.0	0.900	14.616			K Factor = 5.60	
to B2	21.41	150.0 0.0773	0.0	5.000 5.900	0.0 0.456			Vel = 7.21	
B2	41.00	1.598	2P 4.0	17.400	15.072				
to B3	62.41	150.0 0.0910	2R 2.0	6.000	0.0			Vel = 9.98	
	0.0								
	62.41				17.202			K Factor = 15.05	
404	22.88	1.101	1O 5.0	0.900	16.687			K Factor = 5.60	
to B3	22.88	150.0 0.0873	0.0	5.000 5.900	0.0 0.515			Vel = 7.71	
B3	62.41	1.598	5N 45.0	28.700	17.202				
to B4	85.29	150.0 0.1622	2R 2.0	47.000	0.0			Vel = 13.64	
	0.0								
	85.29				29.483			K Factor = 15.71	
*P									
405	29.40	1.101	1O 5.0	0.900	27.556			K Factor = 5.60	
to B5	29.4	150.0 0.1386	0.0	5.000 5.900	0.0 0.818			Vel = 9.91	
B5	0.0	1.394	1N 8.0	7.000	28.374				
to B6	29.4	150.0 0.0440	1R 1.0	9.000	0.0			Vel = 6.18	
B6	0.0	1.394	1O 6.0	3.200	29.078				
to B4	29.4	150.0 0.0440	0.0	6.000 9.200	0.0 0.405			Vel = 6.18	
	0.0								
	29.40				29.483			K Factor = 5.41	
*P									
B4	114.69	1.598	3R 3.0	25.700	29.483				
to B7	114.69	150.0 0.2806	1N 9.0	27.656	0.0			Vel = 18.35	

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes *****
			1T 11.656					
B7 to A8	0.0 114.69	4.26 120.0 0.0036	1V 8.954	32.000 8.954 40.954	44.453 13.859 0.147		Vel = 2.58	
A8 to A9	0.0 114.69	4.26 120.0 0.0036	1B 15.8 1S 28.968 1X 21.067 1Z 13.167	13.400 79.002 92.402	58.459 0.0 0.330		Vel = 2.58	
A9 to TOR	0.0 114.69	4.26 120.0 0.0036	1V 8.954	45.500 8.954 54.454	58.789 3.465 0.195		Vel = 2.58	
TOR to BOR	0.0 114.69	4.26 120.0 0.0036	1Z 13.167 1V 8.954	8.000 22.121 30.121	62.449 0.0 0.108		Vel = 2.58	
BOR to BASE	0.0 114.69	4.26 120.0 0.0035	1E 13.167 1Zia 0.0	3.000 13.167 16.167	62.557 4.370 0.057		* Fixed loss = 3.503 Vel = 2.58	
BASE to H1	0.0 114.69	6.16 140.0 0.0004	1G 4.304 1T 43.037	60.000 47.341 107.341	66.984 0.0 0.048		Vel = 1.23	
H1 to H2	0.0 114.69	12.24 100.0 0.0	1T 48.362	300.000 48.362 348.362	67.032 -3.465 0.010		Vel = 0.31	
H2 to H3	0.0 114.69	6.14 100.0 0.0008	1T 22.732	350.000 22.732 372.732	63.577 -1.732 0.315		Vel = 1.24	
H3 to TEST	0.0 114.69	6.14 100.0 0.0009	1E 10.608 1G 2.273	20.000 12.881 32.881	62.160 0.0 0.028		Vel = 1.24	
	100.00 214.69					62.188	Qa = 100.00 K Factor = 27.22	



... **Fire Protection by Computer Design**

HIGH TECH FIRE PROTECTION
84 HACKETT MILLS ROAD
POLAND, ME 04274
998-2551

Job Name : Sixth Floor Calc.
Building : Marlborough Condo
Location : 180 High Street
System : NFPA 101 #3
Contract : 060410-1
Data File : Sixth Floor Calc.wxf

Hydraulic Design Information Sheet

Name - Sixth Floor Calc. Date - 10/6/2011
 Location - 180 High Street
 Building - Marlborough Condo System No. - NFPA 101 #3
 Contractor - High Tech Fire Protection Contract No. - 060410-1
 Calculated By - Jeremy Foss Drawing No. - FP-1.2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - 8'-0"
 Occupancy - Residential

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

Specific Ruling	Made By	Date
Area of Sprinkler Operation - 448	System Type	Sprinkler/Nozzle
Density - .1	(X) Wet	Make Globe
Area Per Sprinkler - 196	() Dry	Model GL5626
Elevation at Highest Outlet - 72	() Deluge	Size 1/2"
Hose Allowance - Inside -	() Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	() Other	Temp.Rat.155
Hose Allowance - Outside - 100		

N Note

Calculation Flow Required - 211 Press Required - 63
 Summary C-Factor Used: 150 Overhead 100 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 06/16/2009		Cap. -
Time of Test -	Rated Cap.-	Elev.-
Static Press - 69	@ Press -	
Residual Press - 64	Elev. -	Well
Flow - 1061		Proof Flow
Elevation - 12		

U Location - Test Hydrant Located on Deering Avenue Approx. 650' from Site

P Source of Information - Portland Water District

Commodity	Class	Location	
Storage Ht.	Area	Aisle W.	
Storage Method:	%	Palletized %	Rack
() Single Row	() Conven. Pallet	() Auto. Storage	() Encap.
S R () Double Row	() Slave Pallet	() Solid Shelf	() Non
T A () Mult. Row		() Open Shelf	

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

E Horizontal Barriers Provided:

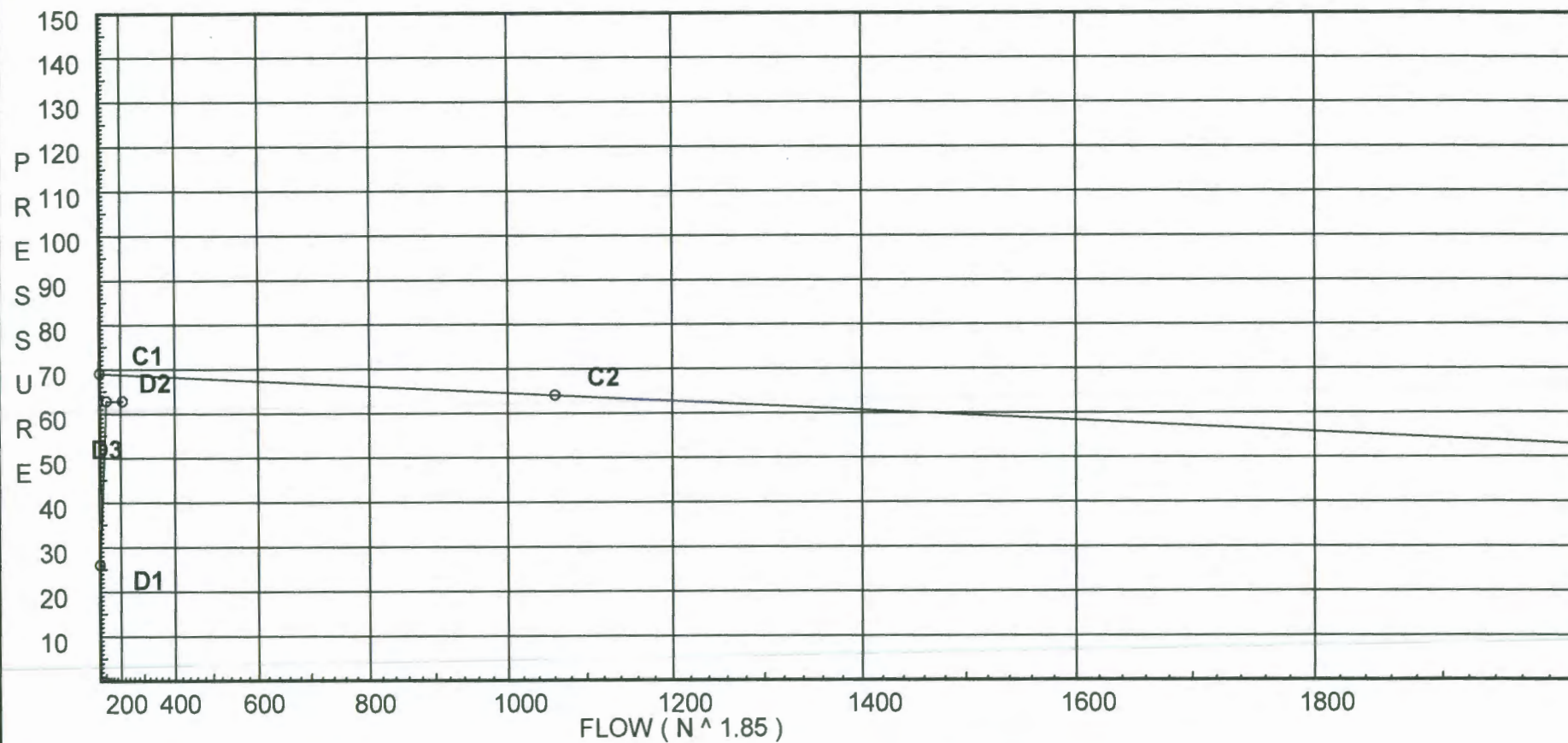
Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
Sixth Floor Calc.

Page 2
Date 10/6/2011

City Water Supply:
 C1 - Static Pressure : 69
 C2 - Residual Pressure: 64
 C2 - Residual Flow : 1061

Demand:
 D1 - Elevation : 25.986
 D2 - System Flow : 110.375
 D2 - System Pressure : 62.775
 Hose (Adj City) :
 Hose (Demand) : 100
 D3 - System Demand : 210.375
 Safety Margin : 5.975



Fittings Used Summary

HIGH TECH FIRE PROTECTION
Sixth Floor Calc.

Page 3
Date 10/6/2011

Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Abbrev.	Name																				
B	Generic Butterfly Valve	0	0	0	0	0	7	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	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N*	CPVC 90'Eil Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O*	CPVC Tee-Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
P*	CPVC 45' Elbow	1	1	1	2	2	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
R*	CPVC Coupling Tee-Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
S	Generic Swing Check Vlv	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
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
V	90' Eil Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

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

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

HIGH TECH FIRE PROTECTION
Sixth Floor Calc.

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Date 10/6/2011

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
201	72.0	5.6	12.25	na	19.6	0.1	196	7.0
A1	72.0		12.77	na				
202	72.0	5.6	13.41	na	20.51	0.1	196	7.0
203	72.0	5.6	13.14	na	20.3	0.1	196	7.0
A2	72.0		13.55	na				
204	72.0	5.6	15.09	na	21.75	0.1	196	7.0
A3	72.0		15.56	na				
205	72.0	5.6	25.38	na	28.21	0.1	196	7.0
A5	72.0		26.13	na				
A6	72.0		26.79	na				
A4	72.0		27.02	na				
A7	72.0		31.95	na				
A8	10.0		59.04	na				
A9	10.0		59.35	na				
TOR	2.0		62.99	na				
BOR	2.0		63.09	na				
BASE	0.0		67.6	na				
H1	0.0		67.64	na				
H2	8.0		64.19	na				
H3	12.0		62.75	na				
TEST	12.0		62.77	na	100.0			

The maximum velocity is 13.14 and it occurs in the pipe between nodes A3 and A4

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	***** Notes *****
201 to A1	19.60 19.6	1.101 150.0 0.0656	1N 7.0 0.0 0.0	0.900 7.000 7.900	12.250 0.0 0.518		K Factor = 5.60 Vel = 6.60
A1 to 202	0.0 19.6	1.394 150.0 0.0208	1N 8.0 2P 4.0 2R 2.0	17.100 14.000 31.100	12.768 0.0 0.646		Vel = 4.12
202 to A2	20.51 40.11	1.394 150.0 0.0778	1R 1.0 0.0 0.0	0.800 1.000 1.800	13.414 0.0 0.140		K Factor = 5.60 Vel = 8.43
	0.0 40.11				13.554		K Factor = 10.89
203 to A2	20.30 20.3	1.101 150.0 0.0698	1O 5.0 0.0 0.0	0.900 5.000 5.900	13.142 0.0 0.412		K Factor = 5.60 Vel = 6.84
A2 to A3	40.11 60.41	1.598 150.0 0.0857	2P 4.0 2R 2.0 0.0	17.400 6.000 23.400	13.554 0.0 2.006		Vel = 9.66
	0.0 60.41				15.560		K Factor = 15.31
204 to A3	21.75 21.75	1.101 150.0 0.0795	1O 5.0 0.0 0.0	0.900 5.000 5.900	15.091 0.0 0.469		K Factor = 5.60 Vel = 7.33
A3 to A4	60.42 82.17	1.598 150.0 0.1514	5N 45.0 2R 2.0 0.0	28.700 47.000 75.700	15.560 0.0 11.461		Vel = 13.14
	0.0 82.17				27.021		K Factor = 15.81
*P							
205 to A5	28.21 28.21	1.101 150.0 0.1285	1O 5.0 0.0 0.0	0.900 5.000 5.900	25.376 0.0 0.758		K Factor = 5.60 Vel = 9.51
A5 to A6	0.0 28.21	1.394 150.0 0.0408	1N 8.0 1R 1.0 0.0	7.000 9.000 16.000	26.134 0.0 0.652		Vel = 5.93
A6 to A4	0.0 28.21	1.598 150.0 0.0210	1O 8.0 0.0 0.0	3.200 8.000 11.200	26.786 0.0 0.235		Vel = 4.51
	0.0 28.21				27.021		K Factor = 5.43
*P							
A4 to A7	110.38 110.38	2.003 150.0 0.0870	3R 3.0 1N 11.0 2P 4.0	25.700 30.965 56.665	27.021 0.0 4.929		Vel = 11.24

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes *****
			1T 12.965					
A7 to A8	0.0 110.38	4.26 120.0 0.0033	1V 8.954 0.0 0.0	62.000 8.954 70.954	31.950 26.852 0.237		Vel = 2.48	
A8 to A9	0.0 110.38	4.26 120.0 0.0033	1B 15.8 1S 28.968 1X 21.067 1Z 13.167	13.400 79.002 92.402	59.039 0.0 0.308		Vel = 2.48	
A9 to TOR	0.0 110.38	4.26 120.0 0.0033	1V 8.954 0.0 0.0	45.500 8.954 54.454	59.347 3.465 0.181		Vel = 2.48	
TOR to BOR	0.0 110.38	4.26 120.0 0.0034	1Z 13.167 1V 8.954 0.0	8.000 22.121 30.121	62.993 0.0 0.101		Vel = 2.48	
BOR to BASE	0.0 110.38	4.26 120.0 0.0033	1E 13.167 1Zia 0.0 0.0	3.000 13.167 16.167	63.094 4.451 0.053		* Fixed loss = 3.585 Vel = 2.48	
BASE to H1	0.0 110.38	6.16 140.0 0.0004	1G 4.304 1T 43.037 0.0	60.000 47.341 107.341	67.598 0.0 0.045		Vel = 1.19	
H1 to H2	0.0 110.38	12.24 100.0 0.0	1T 48.362 0.0 0.0	300.000 48.362 348.362	67.643 -3.465 0.010		Vel = 0.30	
H2 to H3	0.0 110.38	6.14 100.0 0.0008	1T 22.732 0.0 0.0	350.000 22.732 372.732	64.188 -1.732 0.293		Vel = 1.20	
H3 to TEST	0.0 110.38	6.14 100.0 0.0008	1E 10.608 1G 2.273 0.0	20.000 12.881 32.881	62.749 0.0 0.026		Vel = 1.20	
	100.00 210.38					62.775	Qa = 100.00 K Factor = 26.55	