



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.

Installation address: 184 Pearl Street, Portland, ME CBL: 026-E-002-001

Exact location: (within structure) Mechanical Room

Type of occupancy(s) (NFPA & ICC): Light Hazard, Residential

Building owner: Avesta Housing

Managing Supervisor (RMS): Chris Maheux License No: 789

Supervisor phone: 207-942-8809 E-mail: cmaheux@mefirepro.com

Installing contractor: Maine Fire Protection Systems License No: 1

Contractor phone: 207-942-8809 E-mail: service@mefirepro.com

The suppression work to be done will be: New: Renovation: Addition to existing system:

This is an amendment to an existing permit: Yes: NO Permit no: 9988

NFPA Standard this system is designed to: NFPA 13 Edition: 2010

*Non-NFPA systems are not approved for use within the City of Portland.

Download a new copy of this document from www.portlandmaine.gov/fire for every submittal. Attach all working documents and complete approved submittals as may be required by the State Fire Marshal's Office on electronic PDF's in **addition to full sized plans.**

Contractor shall verify location and type of all FDCs shall be approved in writing by the Fire Prevention Bureau.

COST OF WORK: <u>\$158,639.00</u>
PERMIT FEE: <u>\$1616.39</u>
(\$10 PER \$1,000 + \$30 FOR THE FIRST \$1,000)

Submit all information to the Building Inspections Department, 389 Congress Street, Room 315, Portland, Maine 04101.

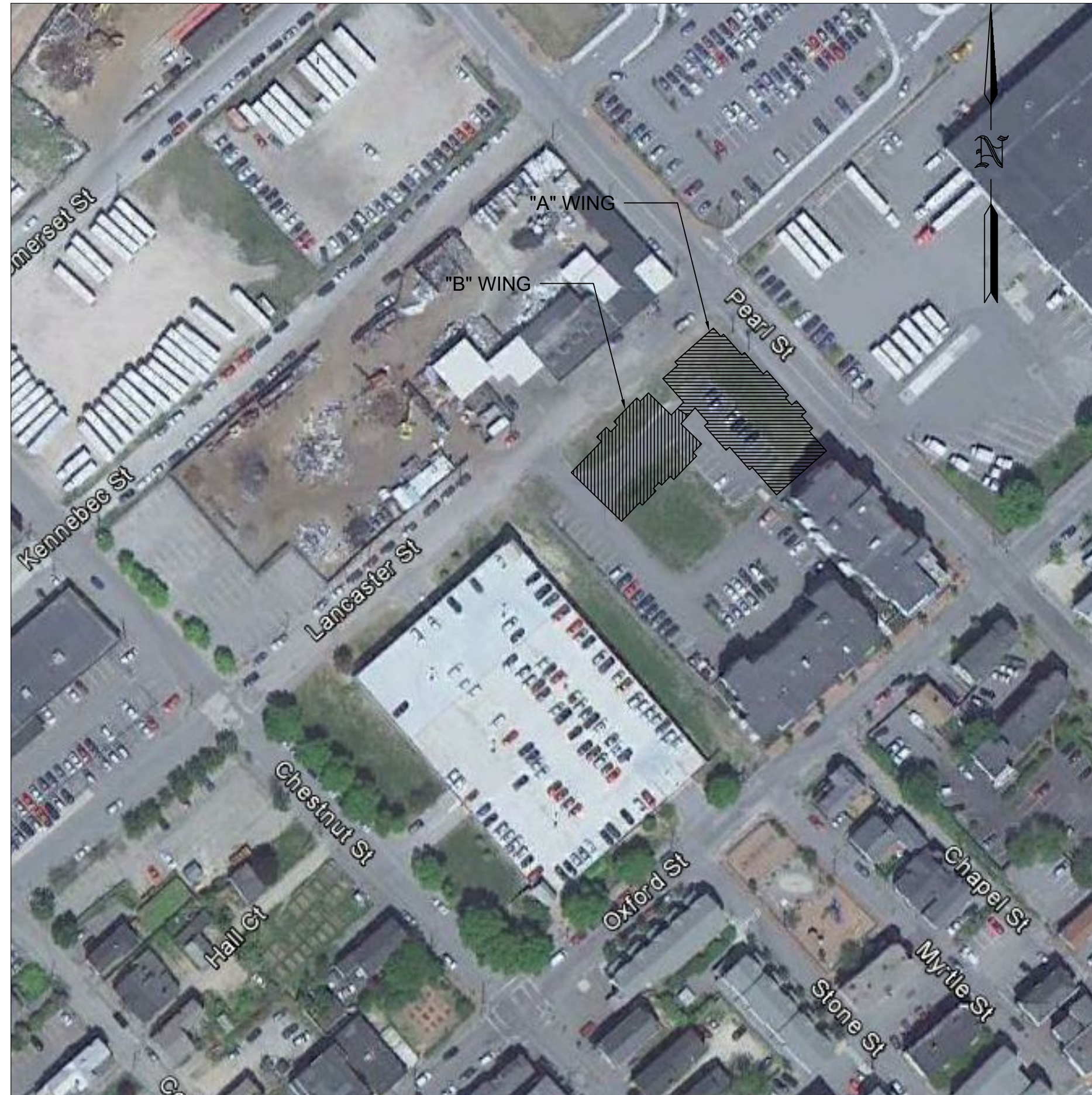
Prior to acceptance of any fire protection system, a complete commissioning and acceptance test must be coordinated with all fire system contractors and the Fire Department, and proper documentation of such test(s) provided.

All installation(s) must comply with NFPA and the Fire Department Technical Standard(s).

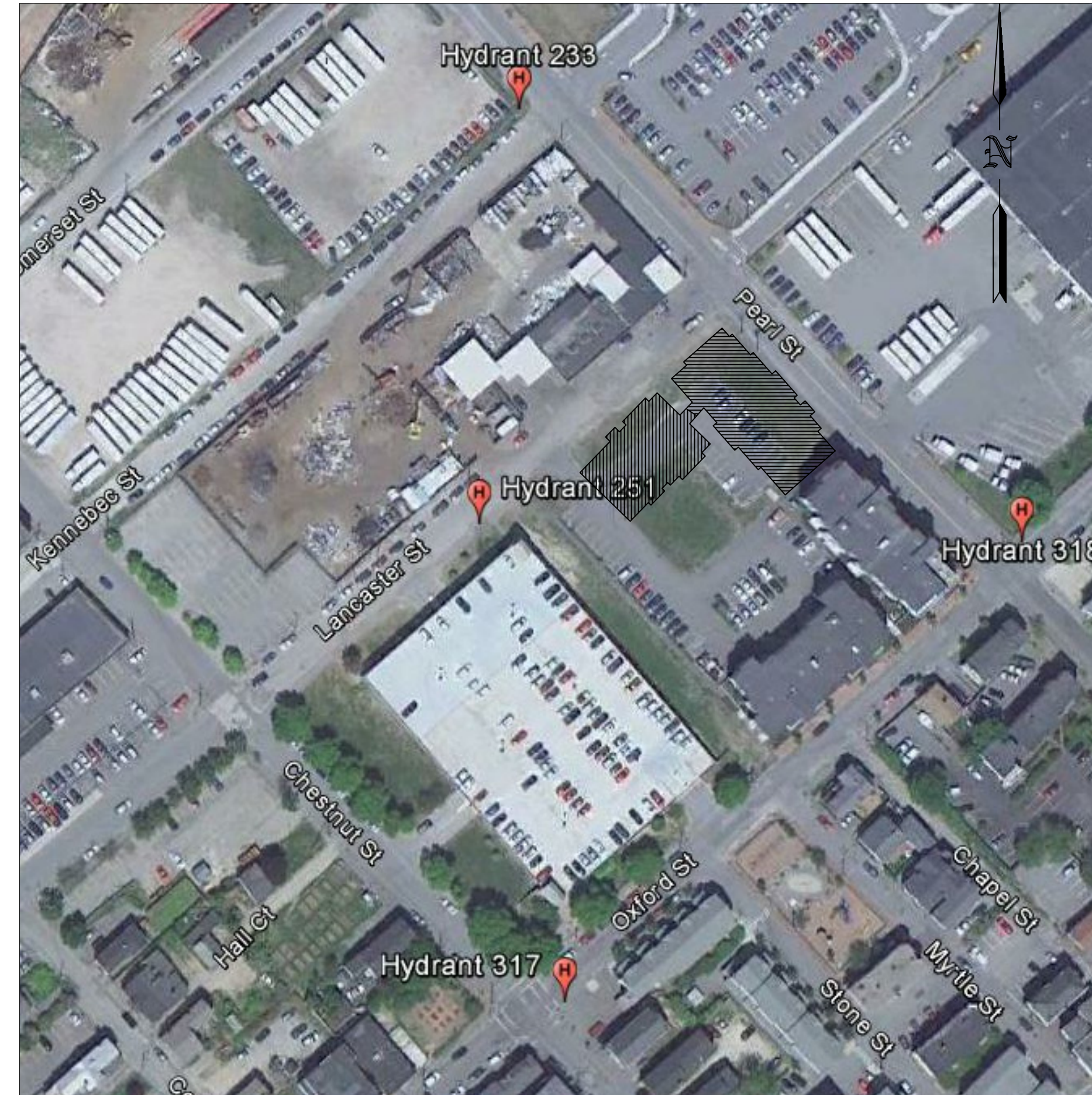
Applicant signature: [Signature] Date: 05/18/2012

PEARL PLACE II - 54 UNITS AFFORDABLE FAMILY HOUSING

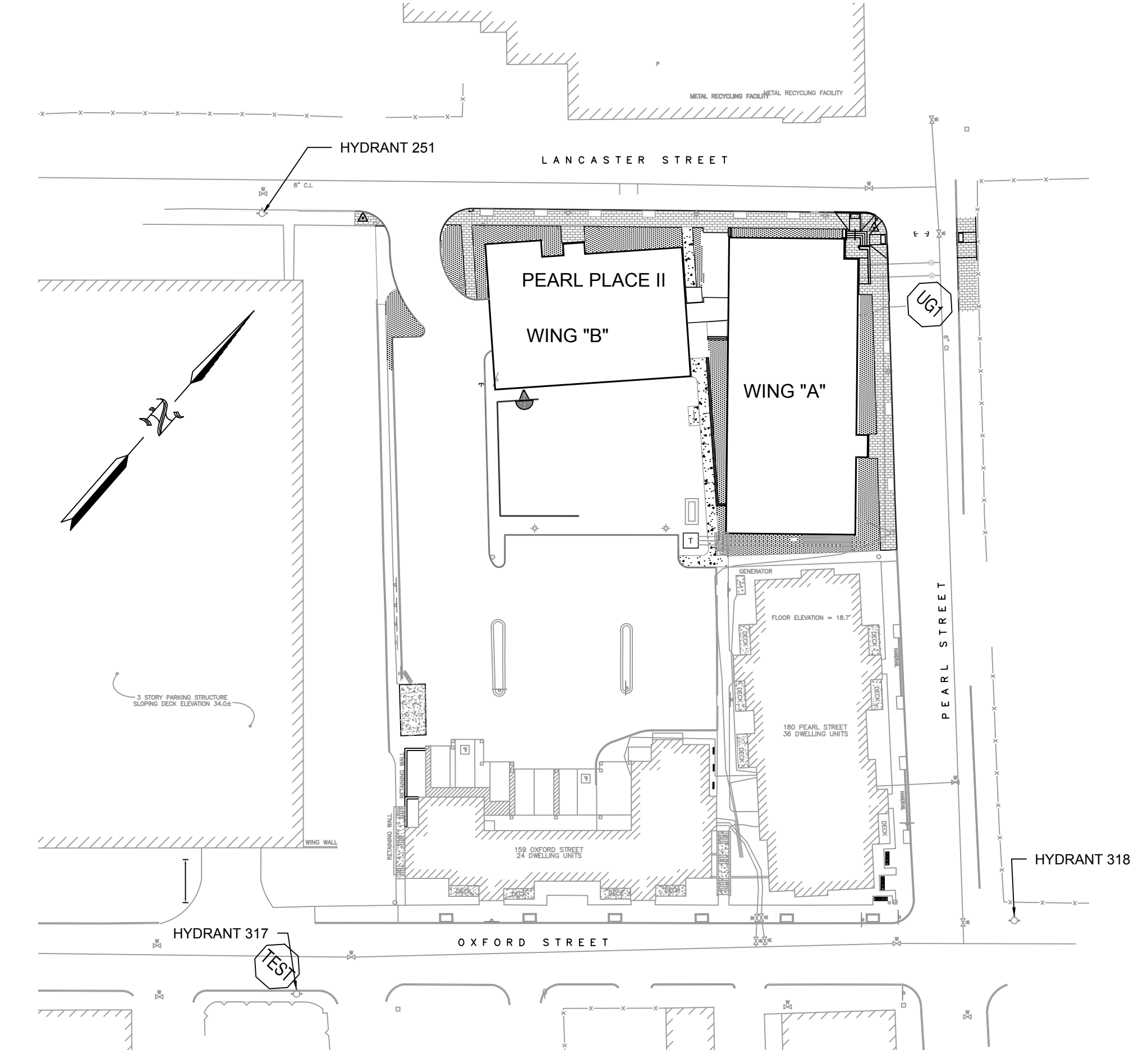
184 PEARL STREET, PORTLAND, MAINE 04101



SITE MAP



SITE HYDRANT LOCATIONS



SITE UNDERGROUND HYDRANT LINES



**MAINE FIRE
PROTECTION
SYSTEMS**

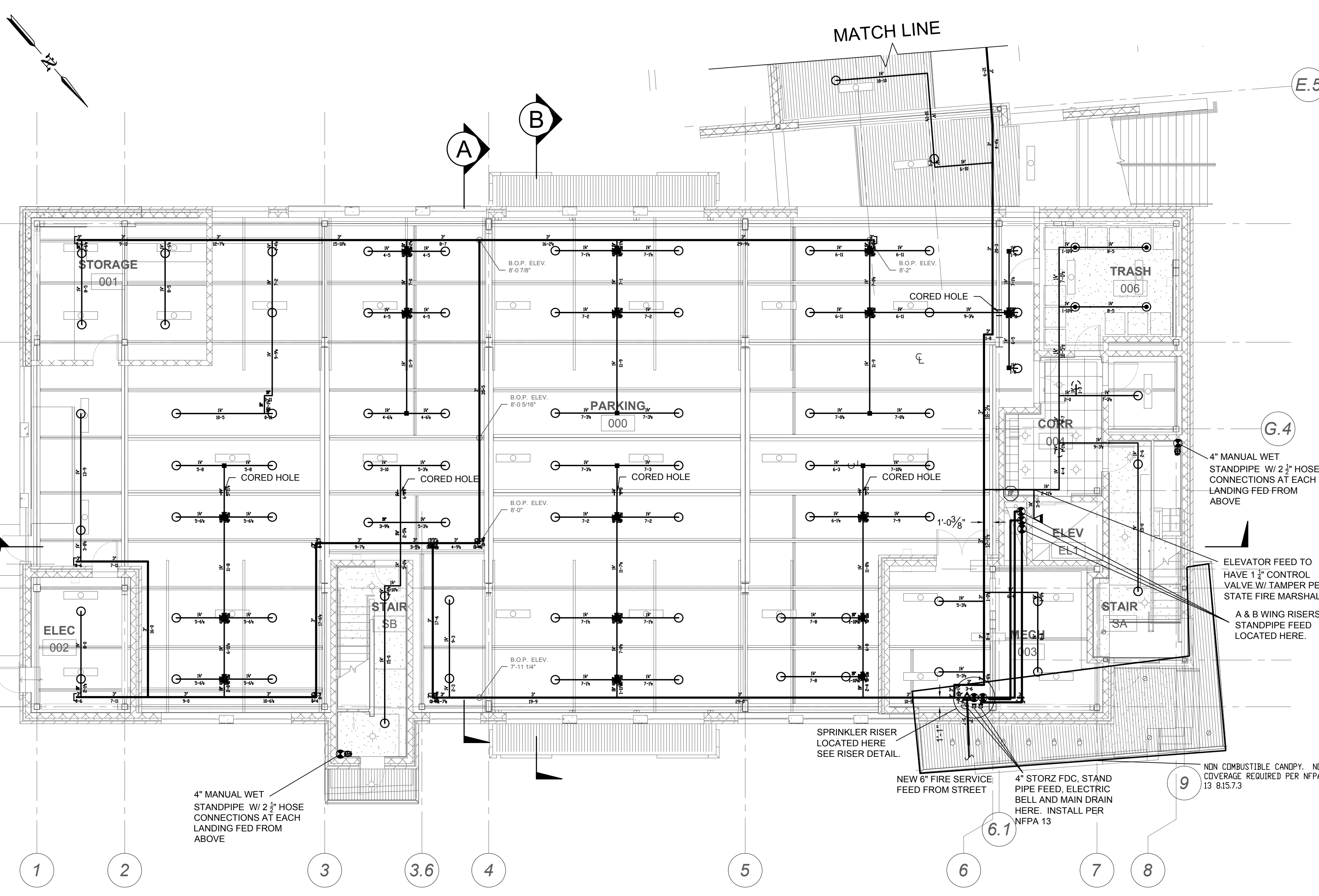
6 DOWD ROAD, BANGOR, MAINE 04401
Ph: 207-942-8809, Fax: 207-941-1910
mailto:service@mefirepro.com

HYDRANT INFORMATION

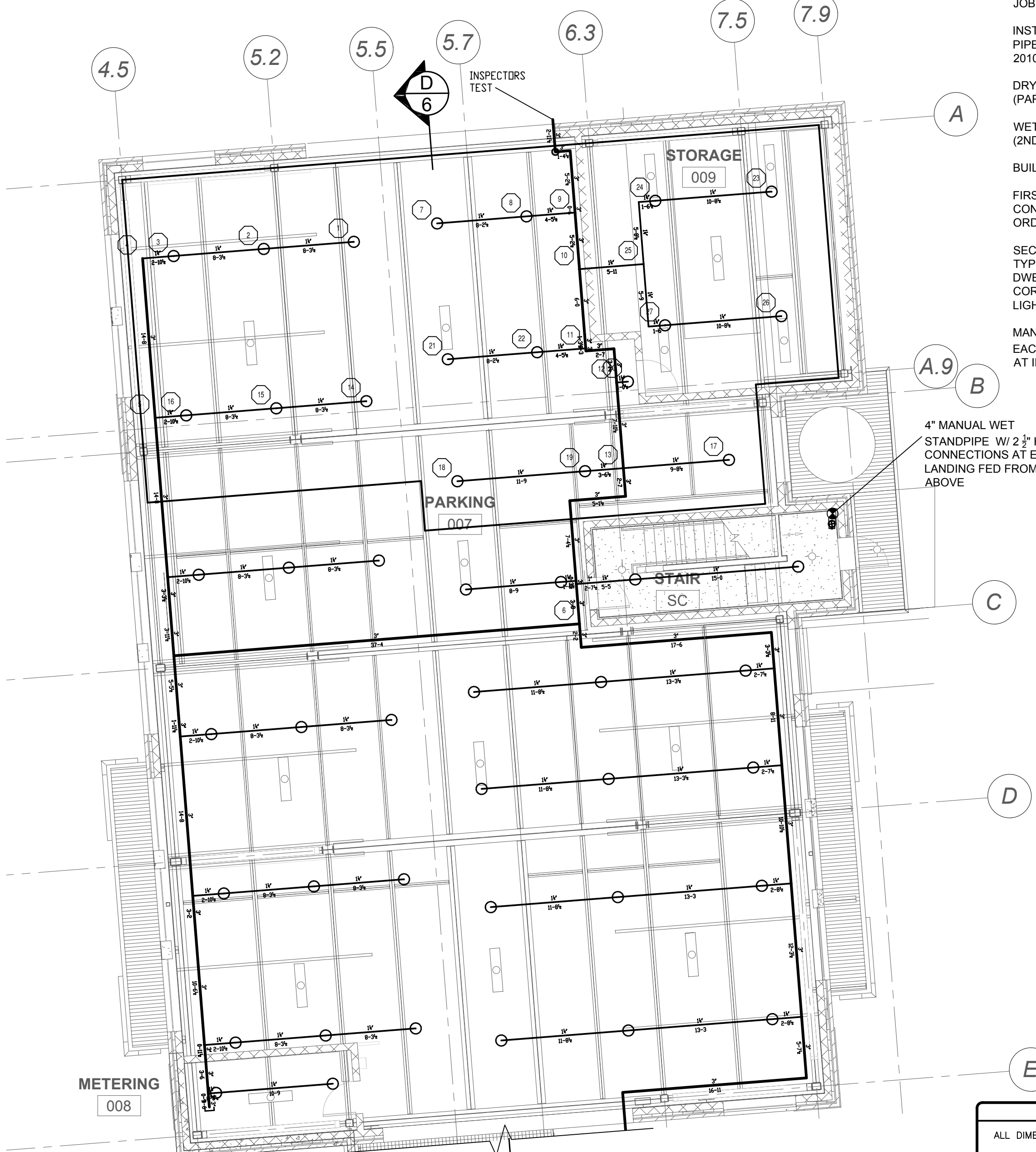
No.	DATE	STATIC	RESID	FLOW	ELEV
233	1991	104	94	996	8'
251	1991	92		1135	10'
317	1993	89	81	1034	32'
318	1991	87		1403	26'

DRAWING LIST

PAGE	DISCRIPTION
1	FIRST FLOOR (PARKING GARAGE)
2	SECOND FLOOR
3	THIRD FLOOR
4	FOURTH FLOOR
5	FIFTH FLOOR
6	SECTIONS & DETAILS
7	DETAILS



"A" WING
FIRST FLOOR PLAN (PARKING GARAGE)
 1/8"=1'-0"



"B" WING
FIRST FLOOR PLAN (PARKING GARAGE)
 1/8"=1'-0"

JOB SCOPE:
 INSTALL FULLY SUPERVISED WET AND DRY PIPE SYSTEMS ACCORDING TO NFPA 13 2010.
 DRY SYSTEM TO SERVE FIRST FLOOR (PARKING GARAGE)
 WET SYSTEM TO SERVE WINGS A AND B (2ND-5TH FLOORS.)
 BUILDING IS NEW CONSTRUCTION.
 FIRST FLOOR (PARKING GARAGE) IS CONSTRUCTION TYPE II ORDINARY HAZARD GROUP 1.
 SECOND-FIFTH FLOOR IS CONSTRUCTION TYPE V111 WITH GWB CEILINGS IN THE DWELLING UNITS AND ACT CEILING IN THE CORRIDORS. TYP. LIGHT HAZARD.
 MANUAL WET STANDPIPES INSTALLED IN EACH STAIRWELL WITH 2 1/2" HOSE VALVES AT INTERMEDIATE LANDINGS.

DESIGN AREA NO. 1	
Location	FIRST FLOOR (GARAGE)
1. Area (sq. ft.)	1573
2. No. of Sprinklers	13
3. Classification	OH1
4. Max storage height (ft.)	8FT
5. Water flow rate (gpm)	39.3
6. Residual pressure at the base of the riser (psi)	62
7. Hose Stream allowance (psi)	250

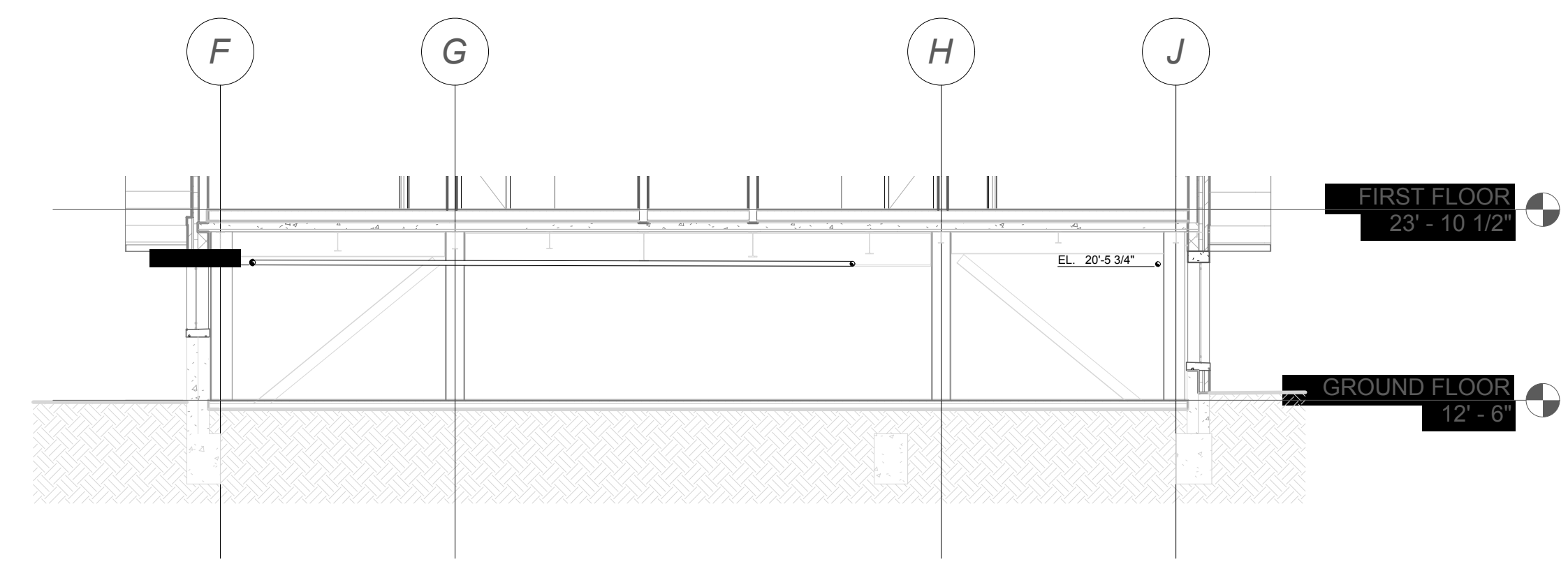
GENERAL INFORMATION	
Commodity Class	N/A
High-Piled Storage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Rack Storage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Max. Storage Height (ft.)	N/A
Min. Aisle Width (ft.)	N/A
Encapsulation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Solid Shelving	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Flammable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Combustible Liquids	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Other Storage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Hazardous Materials	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Idle Pallets	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Flow Test Date	1993
Location	OXFORD STREET
Static (psi)	89
Resid (psi)	81
Flow (gpm)	103.4
Antifreeze Systems	Qty N/A
Type	NONE
Concentration	N/A
Location	Volume (gal)
N/A	N/A
N/A	N/A
N/A	N/A
Location of Aux. Low Point Drains AT RISER	

GENERAL NOTES
 ALL DIMENSIONS SHOWN ARE CENTER TO CENTER.
 PIPE 2" AND SMALLER TO BE SCHEDULE 40 WITH THREADED CAST IRON FITTINGS.
 PIPE 2 1/2" AND LARGER TO BE SCHEDULE 10 WITH GROOVED FITTINGS.
 ALL PIPES AND HANGERS ARE TO BE INSTALLED PER NFPA 13, 2010.
 HANGERS ARE TO BE U.L. LISTED AND F.M. APPROVED.
 OWNER SHALL PROVIDE ADEQUATE HEAT TO PREVENT WET-PIPE SPRINKLER PIPING FROM FREEZING. OWNER SHALL MAINTAIN SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 25 AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.
 THIS SYSTEM HAS BEEN DESIGNED BY AND SHALL BE INSTALLED BY MAINE FIRE PROTECTION SYSTEMS AND USE OF THESE DRAWINGS FOR OTHER PURPOSES IS STRICTLY PROHIBITED.

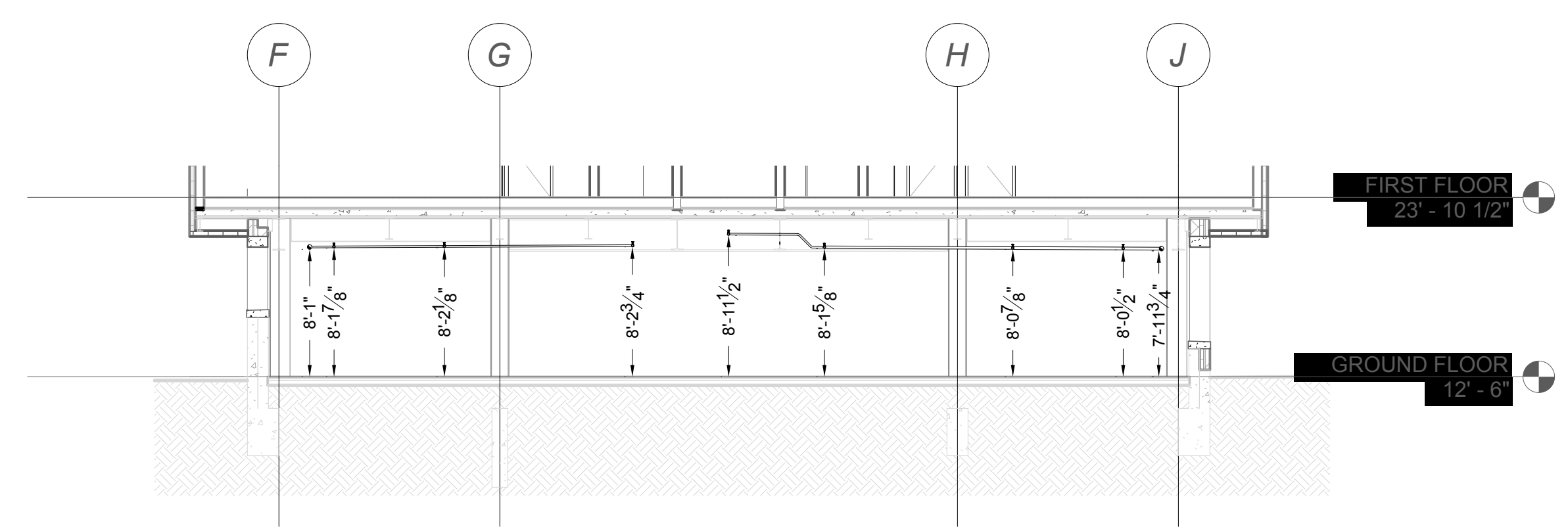
DRY SPRINKLER SYSTEM NOTES
 DRY SYSTEM CAPACITY : 560 GALLONS
 PITCH MAINS NOT LESS THAN 1/4" PER 10 FT. PITCH LINES NOT LESS THAN 1/2" PER 10 FT. "VICTAULIC" GROOVED COUPLINGS USED FOR DRY SYSTEM SHALL HAVE "FLUSH SEAL" GASKETS. REDUCERS SHALL BE "VICTAULIC" STYLE #50 CONCENTRIC GROOVED TYPE.
 DRY SYSTEM COVERING APPROX 14,725 SQFT

SYMBOL	DESCRIPTION
()	HYDRAULIC REFERENCE POINTS
[]	ELEV. BELOW TOP OF STEEL
[+]	ELEV. ABOVE FINISHED FLOOR
+ (108 120-0)	ELEV. OF TOP OF STEEL
()	CEILING HEIGHT
()	NOTES HANGER LOCATION
()	RISE UP OR DOWN

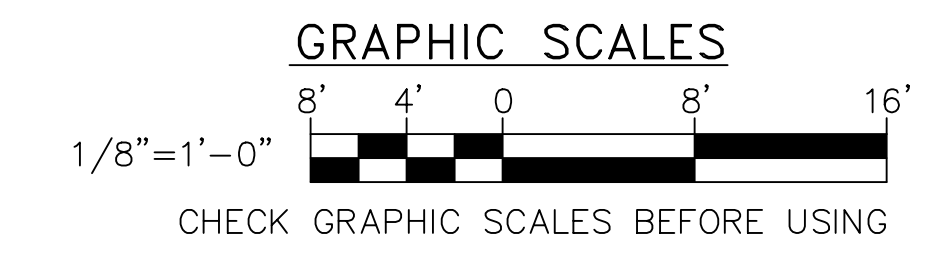
REVISIONS	DATE



BUILDING SECTION CROSS "A" WING
 1/8"= 1'-0"



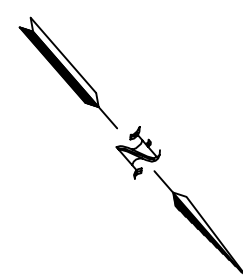
BUILDING SECTION - CROSS @ "A" WING BUMP OUT
 1/8"= 1'-0"



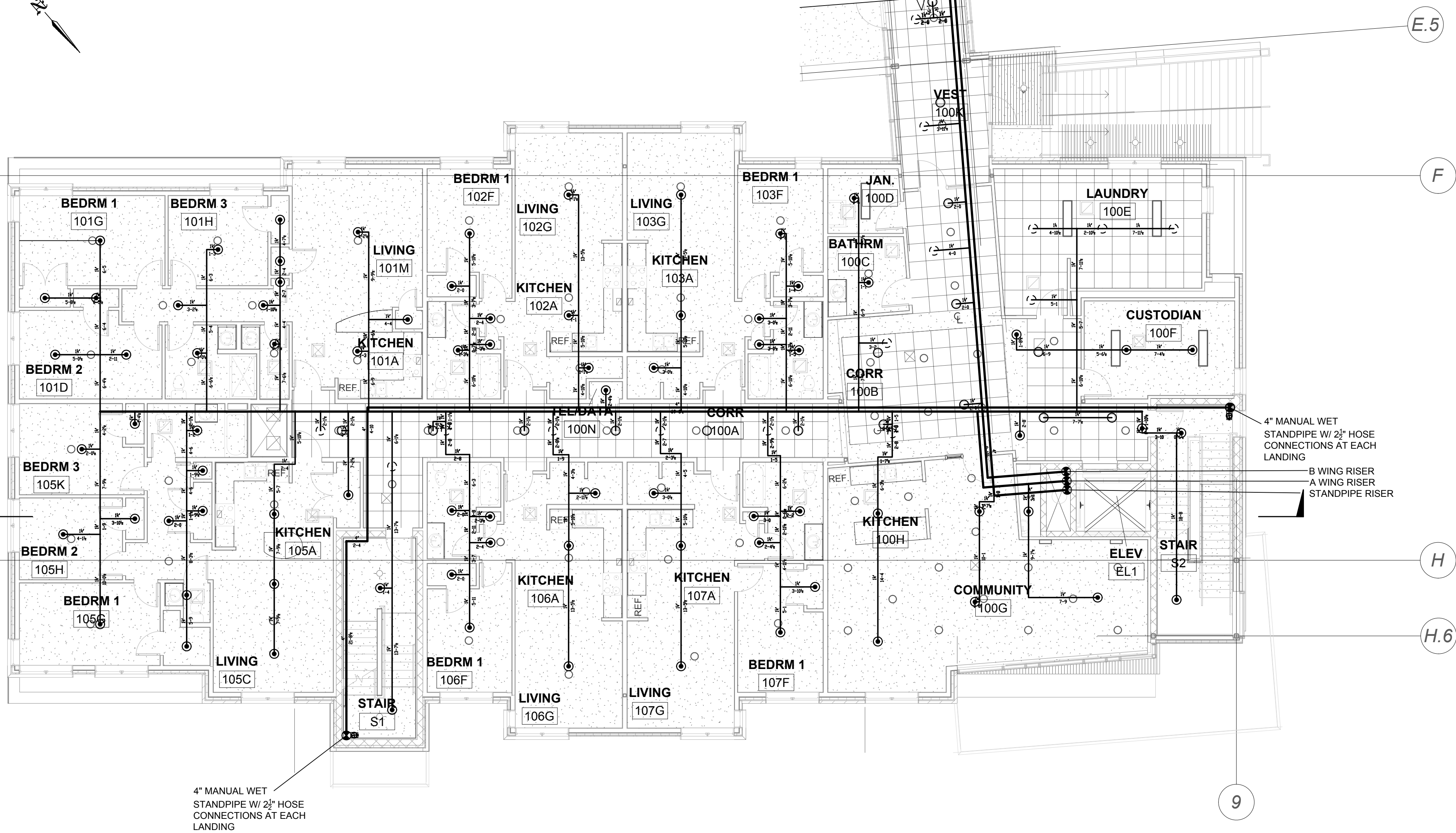
SPRINKLER SYSTEM # 1	LOCATION: WING "A" & "B" FIRST FLOOR	NOTES
1/2" 2	1/2", K=5.6 TYCO TY3231	155 WHITE QR SEMI-RECESSED PENDENT
1/2" 4	1/2", K=5.6 TYCO TY3131	155 BRASS QR UPRIGHT
1/2" 4	1/2", K=5.6 TYCO TY3531	155 CHROME QR CONCEALED PENDENT
1/2" 1	1/2", K=5.6 TYCO TY3331	155 WHITE QR SIDEWALL

DRAWN BY	DATE	APPROVAL BY
DPW	04/16/2012	ST FIRE MARSHAL
FILE NAME	699.dwg	CONTRACTOR
JOB NO.	0699	MAINE FIRE PROTECTION
JOB NAME	PEARL PLACE II	6 DOWD ROAD
		BANGOR, ME 04401
		FIRST FLOOR FIRE PROTECTION
		1/8" = 1'-0"
		SHEET 1 OF 2

DATE PRINTED: 4/16/12



MATCH LINE

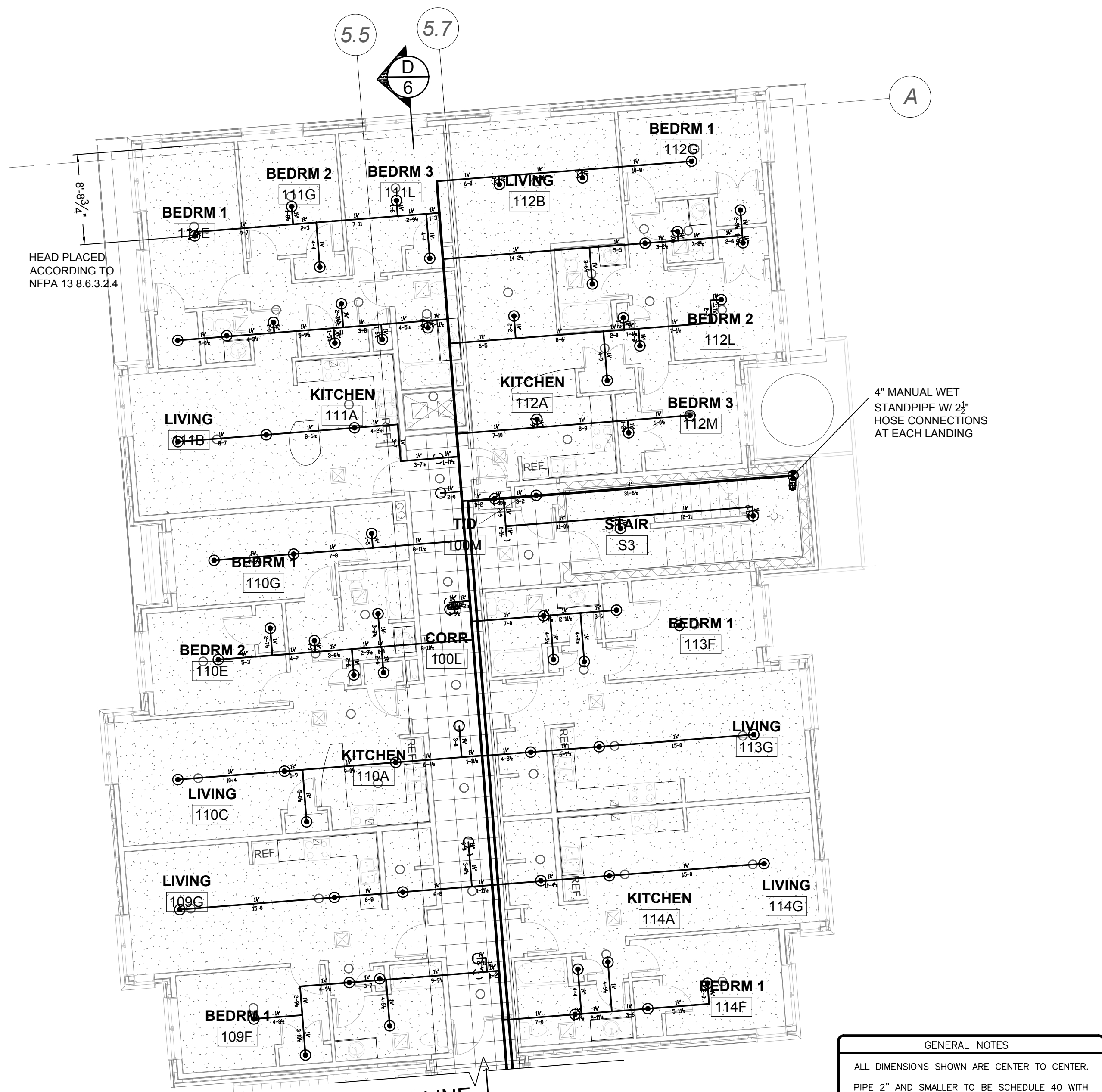


"A" WING
SECOND FLOOR PLAN
1/8"=1'-0"

4" MANUAL WET STANDPIPE W/ 2" HOSE CONNECTIONS AT EACH LANDING

4" MANUAL WET STANDPIPE W/ 2" HOSE CONNECTIONS AT EACH LANDING
B WING RISER
A WING RISER
STANDPIPE RISER

9



"B" WING
SECOND FLOOR PLAN
1/8"=1'-0"

HEAD PLACED ACCORDING TO NFPA 13 8.6.3.2.4

4" MANUAL WET STANDPIPE W/ 2" HOSE CONNECTIONS AT EACH LANDING

GENERAL NOTES

ALL DIMENSIONS SHOWN ARE CENTER TO CENTER.
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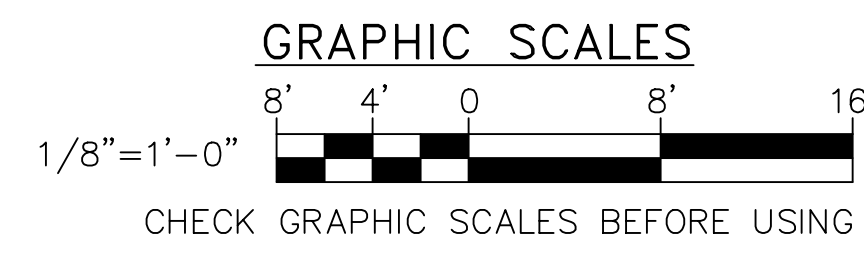
SYMBOL	DESCRIPTION
()	HYDRAULIC REFERENCE POINTS
[-#]	ELEV. BELOW TOP OF STEEL
[+#]	ELEV. ABOVE FINISHED FLOOR
+ (10# 120-0)	ELEV. OF TOP OF STEEL
(-#)	CEILING HEIGHT
(-#)	DENOTES HANGER LOCATION
○	RISE UP OR DOWN

REVISIONS	DATE



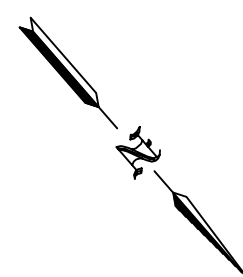
SECOND FLOOR APPROX 14,252 SQFT
VERIFY LOCATION OF HIGH TEMPERATURE SPRINKLERS AND INSTALL PER NFPA 13.
ALL PENDENTS ON DROPS

QTY	ORIFICE	MAKE	MODEL	TEMP	FINISH	NOTES
153	1/2", K=5.6	TYCO	TY3531	155	CHROME	QR CONCEALED PENDENT
21	1/2", K=5.6	TYCO	TY3189	175	BRASS	FR COMBUSTIBLE CONCEALED UPRIGHT
21	1/2", K=5.6	TYCO	TY3231	155	WHITE	QR SEMI-RECESSED PENDENT

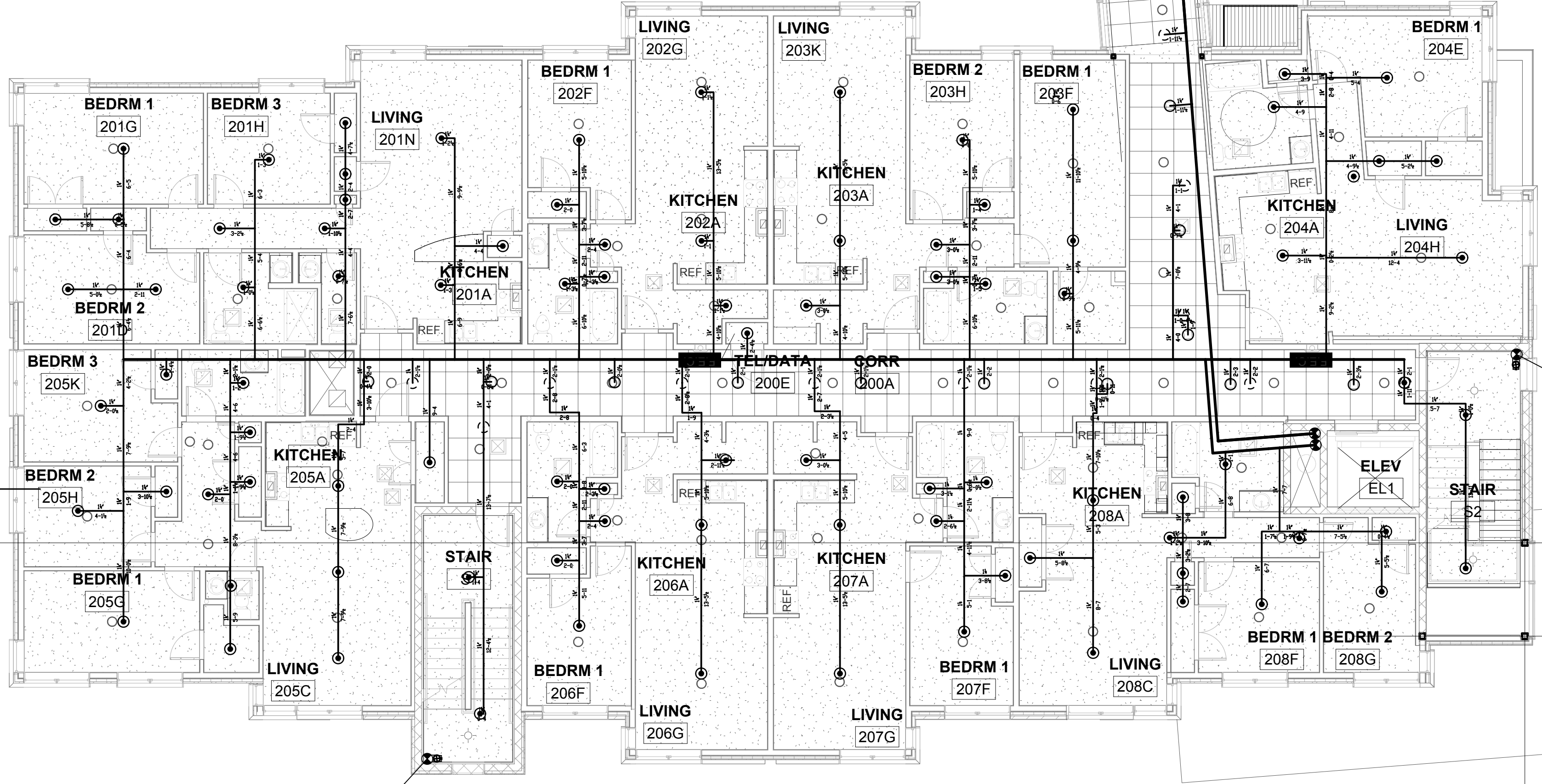


DRAWN BY DPW	DATE 04/16/2012	APPROVAL BY ST FIRE MARSHAL
FILE NAME 699.dwg	CONTRACTOR MAINE FIRE PROTECTION	
JOB NO. 0699	6 DOWD ROAD BANGOR, ME 04401	
JOB NAME PEARL PLACE II		
184 PEARL ST., PORTLAND, MAINE		
SECOND FLOOR FIRE PROTECTION		
1/8" = 1'-0"		SHEET 2 OF 7

DATE PRINTED: 4/16/12



MATCH LINE



C
6

E.5

H

H.6

9

4" MANUAL WET
STANDPIPE W/ 2" HOSE
CONNECTIONS AT EACH
LANDING

"A" WING
THIRD FLOOR PLAN
1/8"=1'-0"



5.5
5.7
D
6

A

MATCH LINE

"B" WING
THIRD FLOOR PLAN
1/8"=1'-0"

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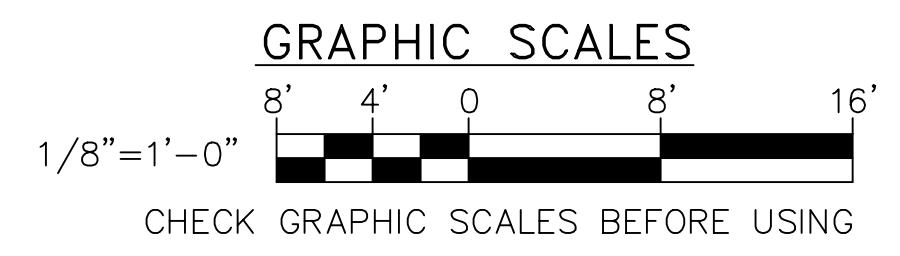
SYMBOLS	
SYMBOL	DESCRIPTION
()	HYDRAULIC REFERENCE POINTS
[]	ELEV. BELOW TOP OF STEEL
[+]	ELEV. ABOVE FINISHED FLOOR
+ ()	ELEV. OF TOP OF STEEL
()	CEILING HEIGHT
()	DENOTES HANGER LOCATION
()	RISE UP OR DOWN

REVISIONS	DATE



THIRD FLOOR APPROX 14,191 SQFT
VERIFY LOCATION OF HIGH TEMPERATURE SPRINKLERS AND INSTALL PER NFPA 13.
ALL PENDENTS ON DROPS

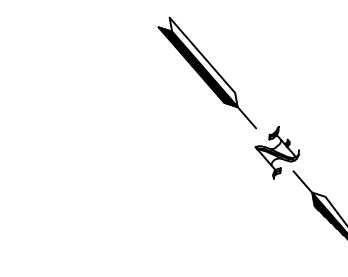
SPRINKLER SYSTEM # 2&3 LOCATION: WING "A" & "B" THIRD FLOOR						
QTY	ORIFICE	MAKE	MODEL	TEMP	FINISH	NOTES
159	1/2", K=5.6	TYCO	TY3531	155	CHROME	QR CONCEALED PENDENT
19	1/2", K=5.6	TYCO	TY3189	175	BRASS	FR COMBUSTIBLE CONCEALED UPRIGHT
19	1/2", K=5.6	TYCO	TY3231	155	WHITE	QR SEMI-RECESSED PENDENT



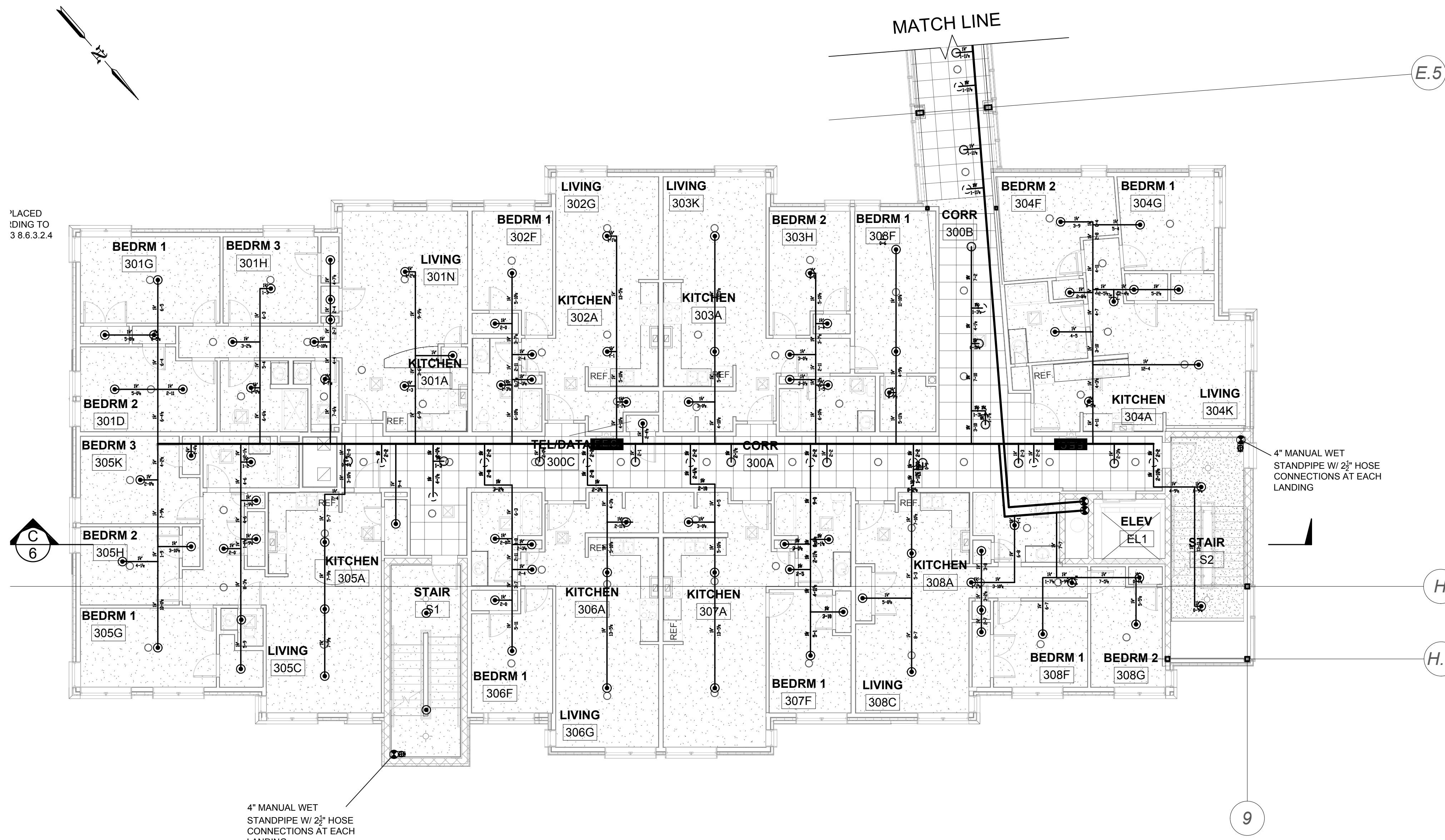
DRAWN BY: DPW
FILE NAME: 699.dwg
JOB NO.: 0699
JOB NAME: PEARL PLACE II
184 PEARL ST., PORTLAND, MAINE
THIRD FLOOR FIRE PROTECTION
1/8" = 1'-0"

DATE: 04/16/2012
APPROVAL BY: ST FIRE MARSHAL
CONTRACTOR: MAINE FIRE PROTECTION
6 DOWD ROAD
BANGOR, ME 04401

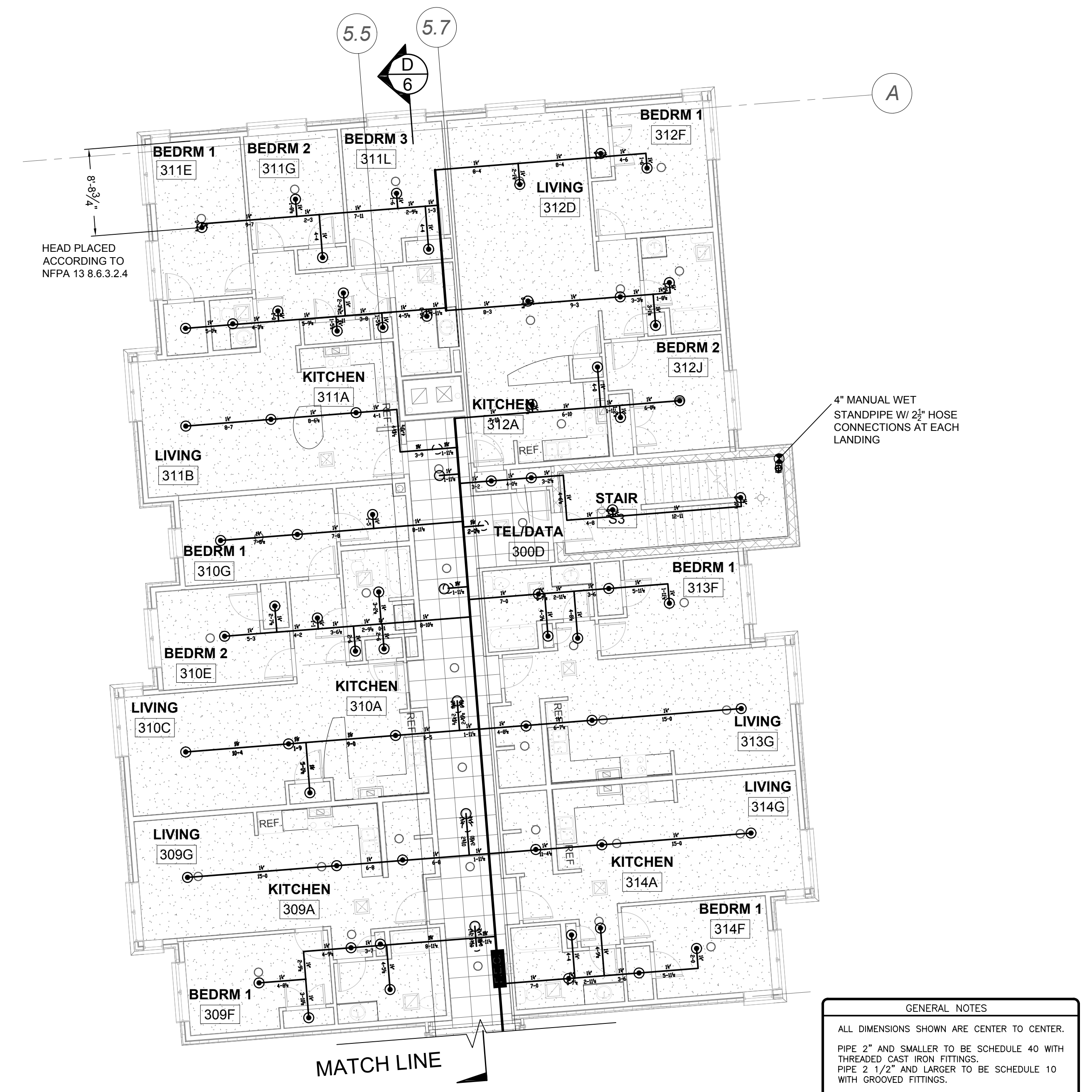
DATE PRINTED: 4/16/12
SHEET 3 OF 7



PLACED
ACCORDING TO
3.8.6.3.2.4



"A" WING
FOURTH FLOOR PLAN
1/8"=1'-0"



"B" WING
FOURTH FLOOR PLAN
1/8"=1'-0"

GENERAL NOTES

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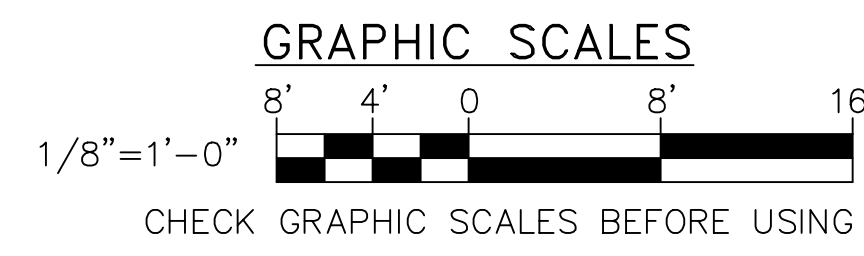
SYMBOL	DESCRIPTION
()	HYDRAULIC REFERENCE POINTS
[]	ELEV. BELOW TOP OF STEEL
[+]	ELEV. ABOVE FINISHED FLOOR
+ ()	ELEV. OF TOP OF STEEL
()	CEILING HEIGHT
()	DENOTES HANGER LOCATION
()	RISE UP OR DOWN

REVISIONS	DATE



FOURTH FLOOR APPROX 14,209 SQFT
VERIFY LOCATION OF HIGH TEMPERATURE SPRINKLERS AND INSTALL PER NFPA 13.
ALL PENDENTS ON DROPS

QTY	ORIFICE	MAKE	MODEL	TEMP	FINISH	NOTES
159	1/2", K=5.6	TYCO	TY3531	155	CHROME	QR CONCEALED PENDENT
19	1/2", K=5.6	TYCO	TY3189	175	BRASS	FR COMBUSTIBLE CONCEALED UPRIGHT
19	1/2", K=5.6	TYCO	TY3231	155	WHITE	QR SEMI-RECESSED PENDENT

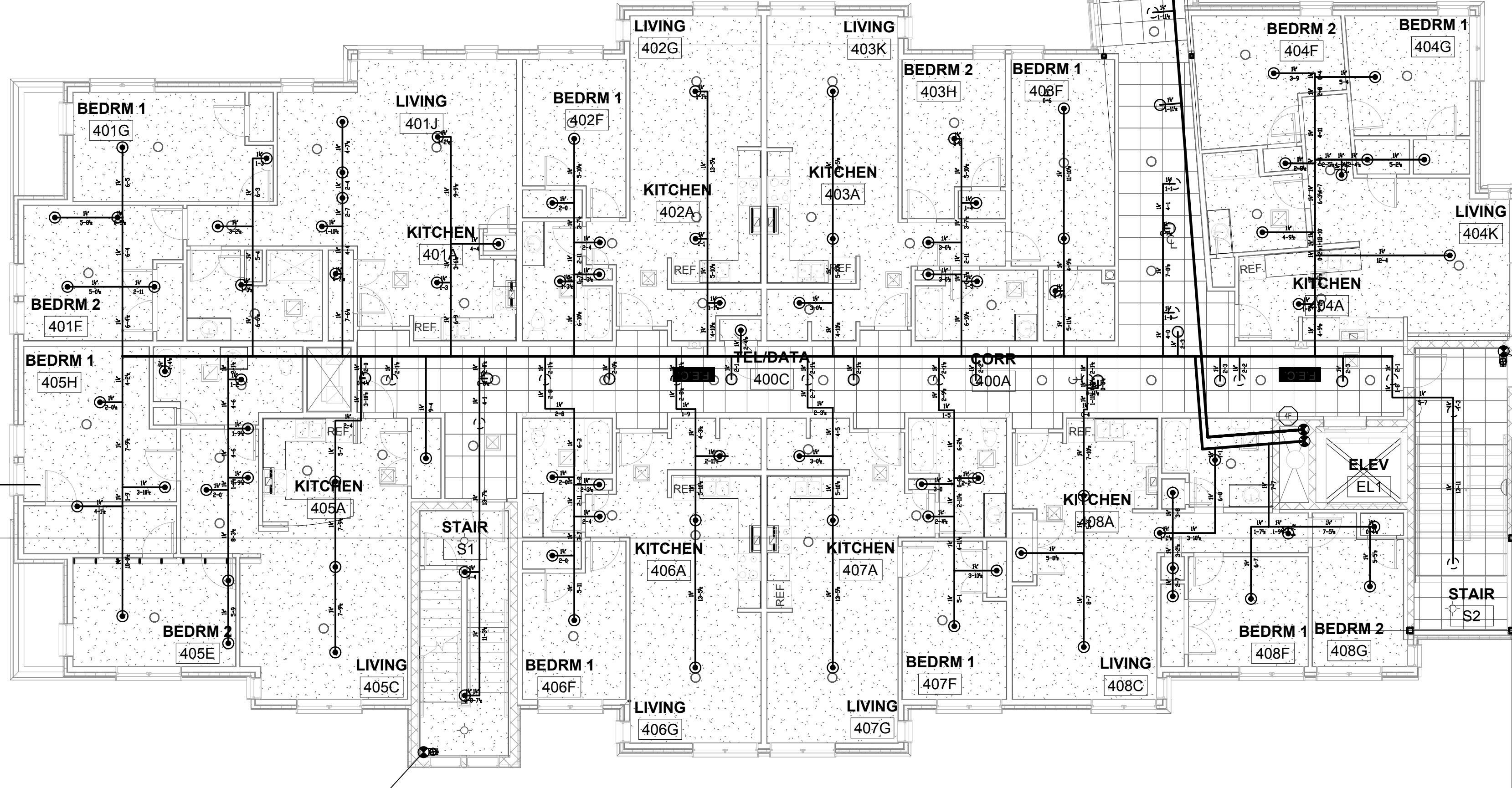


DRAWN BY	DATE	APPROVAL BY
DPW	04/16/2012	ST FIRE MARSHAL
FILE NAME	CONTRACTOR	
699.dwg	MAINE FIRE PROTECTION	
JOB NO.	6 DOWD ROAD	
0699	BANGOR, ME 04401	
JOB NAME	PEARL PLACE II	
	184 PEARL ST., PORTLAND, MAINE	
	FOURTH FLOOR FIRE PROTECTION	
	1/8" = 1'-0"	
	SHEET 4 OF 7	

DATE PRINTED: 4/16/12

MATCH LINE

E.5



4" MANUAL WET STANDPIPE W/ 2" HOSE CONNECTIONS AT EACH LANDING

"A" WING
FIFTH FLOOR PLAN
1/8"=1'-0"

9

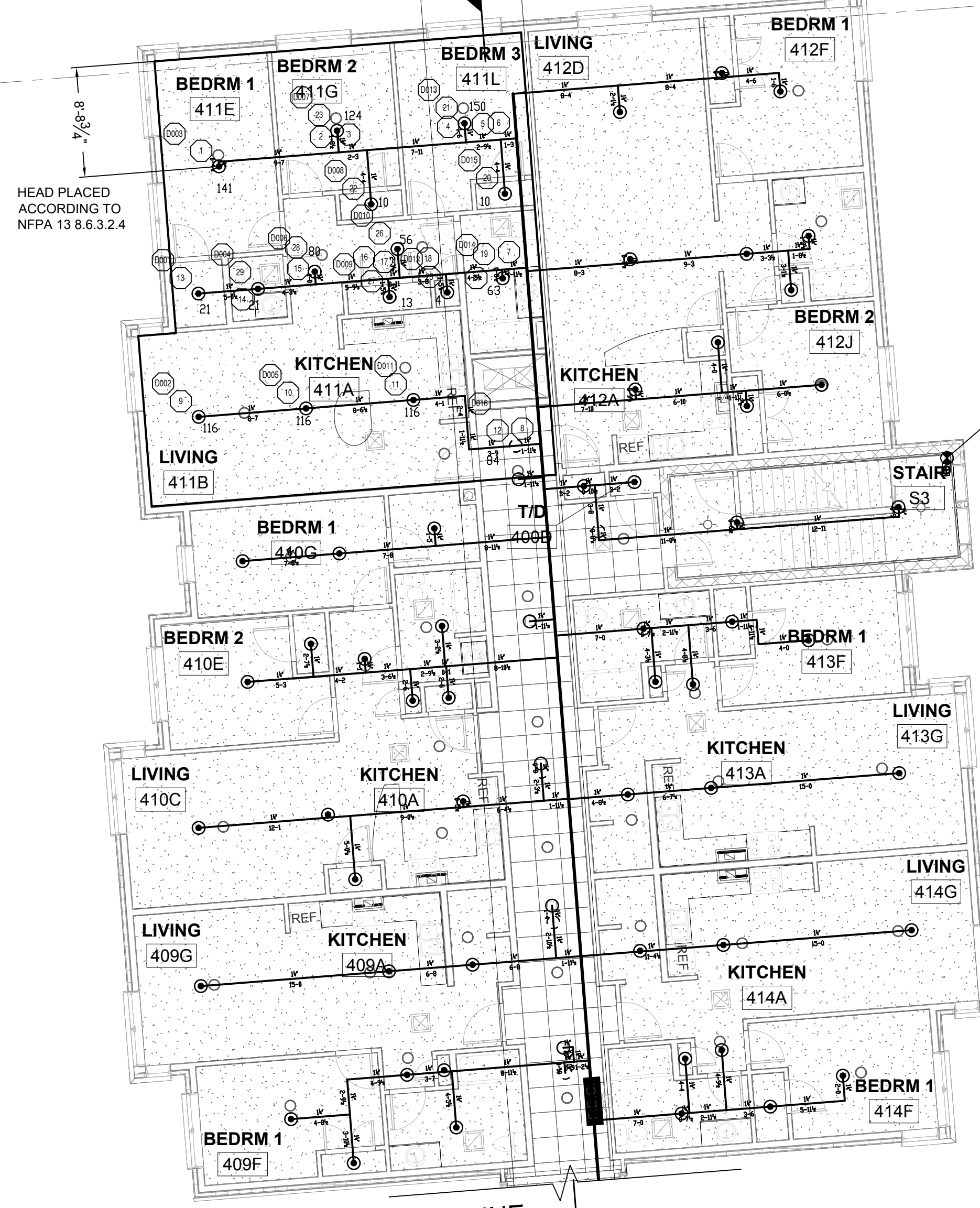
H

H.6

5.5 5.7
D 6

A

HEAD PLACED ACCORDING TO NFPA 13 8.6.3.2.4



DESIGN AREA NO. 2	
Location 5TH FLOOR	
1. Density (GPM/SQFT)	.1
2. Area (SQFT)	1071
3. No. of Sprinklers	16
4. Classification	LH
5. Max storage height (FT)	N/A
Demand	
1. Water flow rate (GPM)	282
2. Residual pressure at the base of the riser (PSI)	55
3. Hose Stream allowance (GPM)	100

DESIGN AREA PER NFPA 13 11.2.3.2.3.1

4" MANUAL WET STANDPIPE W/ 2" HOSE CONNECTIONS AT EACH LANDING

"B" WING
FIFTH FLOOR PLAN
1/8"=1'-0"

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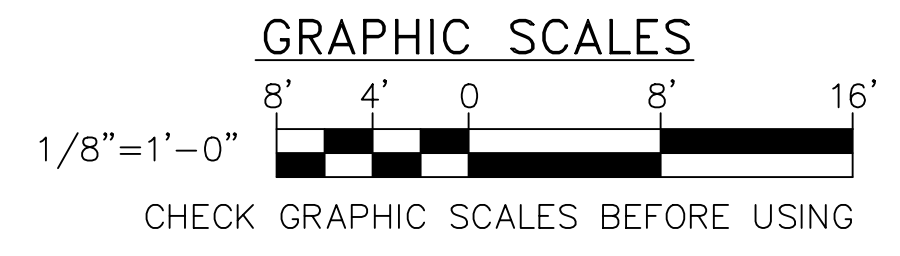
SYMBOL	DESCRIPTION
()	HYDRAULIC REFERENCE POINTS
[]	ELEV. BELOW TOP OF STEEL
[+]	ELEV. ABOVE FINISHED FLOOR
+ ()	ELEV. OF TOP OF STEEL
()	CEILING HEIGHT
()	DENOTES HANGER LOCATION
()	RISE UP OR DOWN

REVISIONS	DATE



FIFTH FLOOR APPROX 14,112 SQFT
VERIFY LOCATION OF HIGH TEMPERATURE SPRINKLERS AND INSTALL PER NFPA 13.
ALL PENDENTS ON DROPS

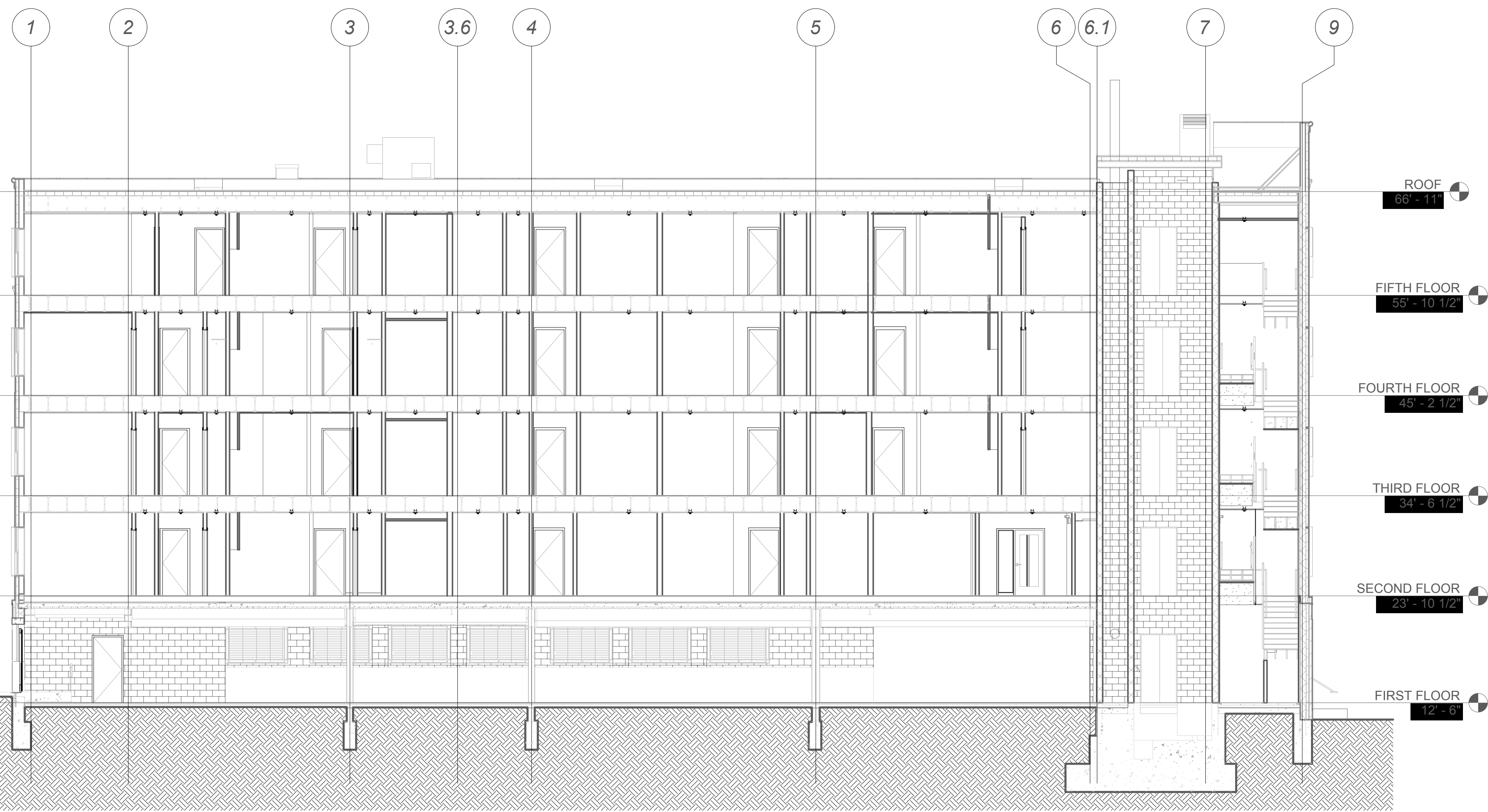
SPRINKLER SYSTEM #	LOCATION: WING "A" & "B" FIFTH FLOOR	NOTES
157	1/2", K=5.6 TYCO TY3531 155 CHROME	QR CONCEALED PENDENT
19	1/2", K=5.6 TYCO TY3189 175 BRASS	FR COMBUSTIBLE CONCEALED UPRIGHT
22	1/2", K=5.6 TYCO TY3231 155 WHITE	QR SEMI-RECESSED PENDENT



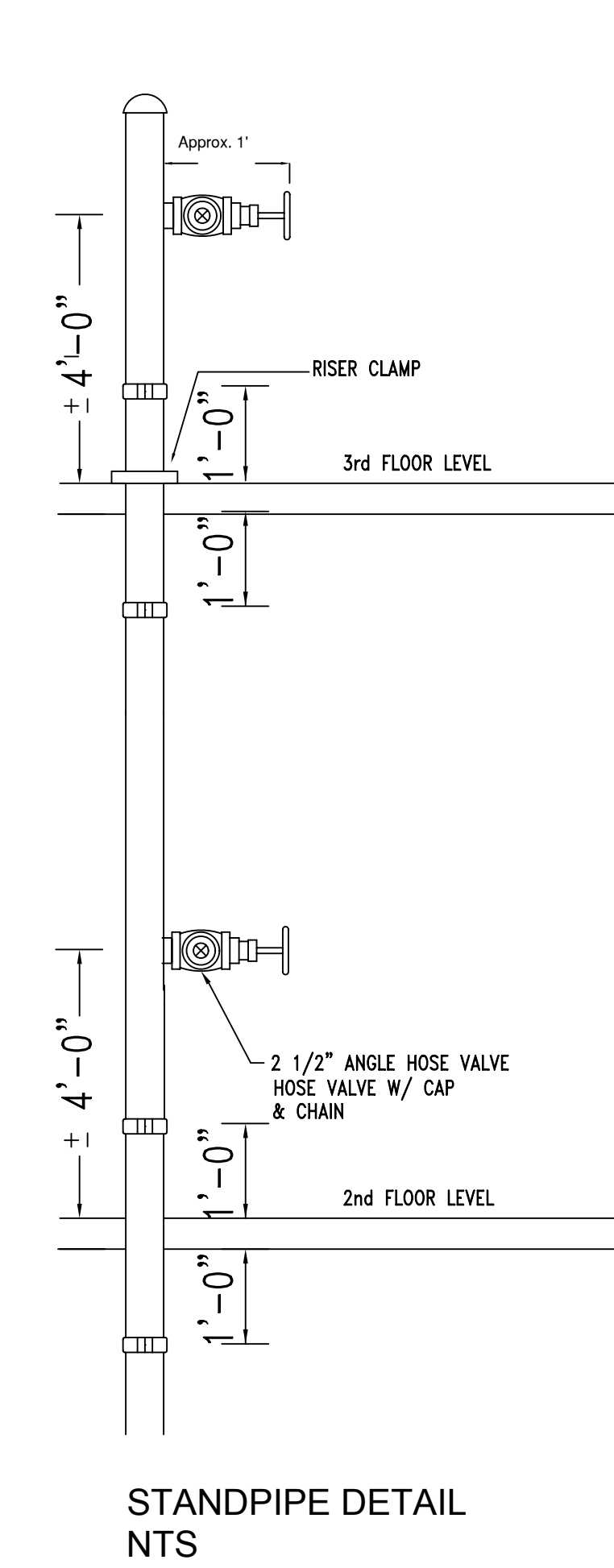
DRAWN BY	DATE	APPROVAL BY
DPW	04/16/2012	ST FIRE MARSHAL
FILE NAME	699.dwg	CONTRACTOR
JOB NO.	0699	MAINE FIRE PROTECTION 6 DOWD ROAD BANGOR, ME 04401
JOB NAME	PEARL PLACE II 184 PEARL ST., PORTLAND, MAINE FIFTH FLOOR FIRE PROTECTION 1/8" = 1'-0"	

SHEET 5 OF 7

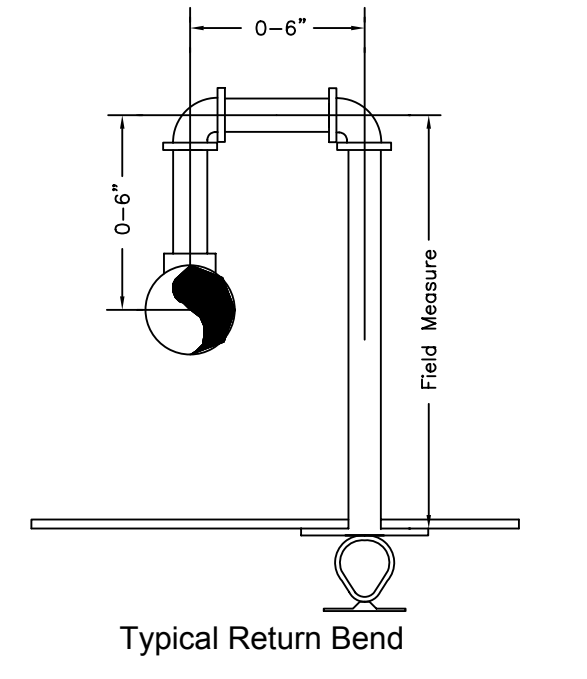
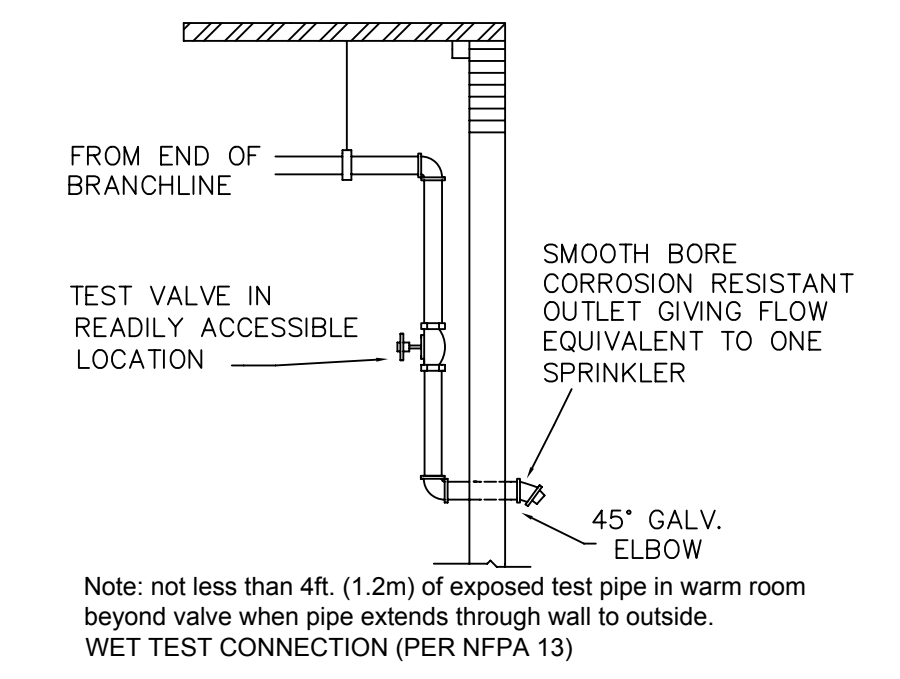
DATE PRINTED: 4/16/12



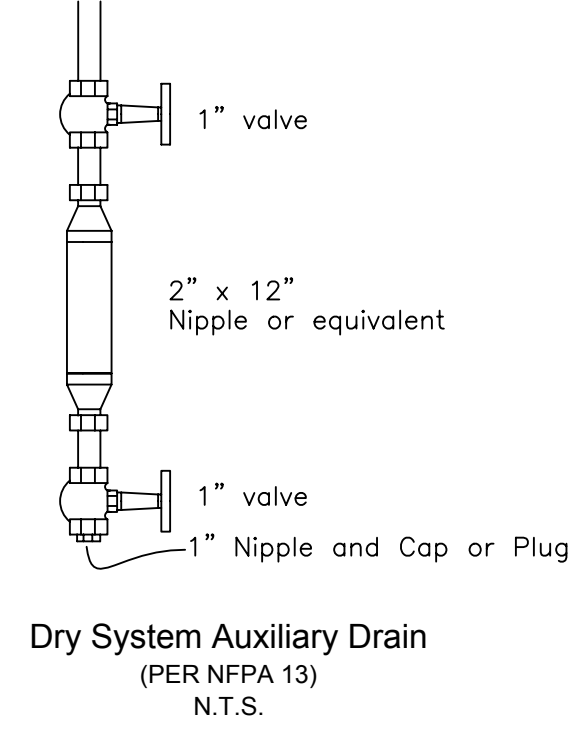
BUILDING SECTION - LONGITUDINAL A WING
1/8" = 1'-0" **C**



STANDPIPE DETAIL
NTS

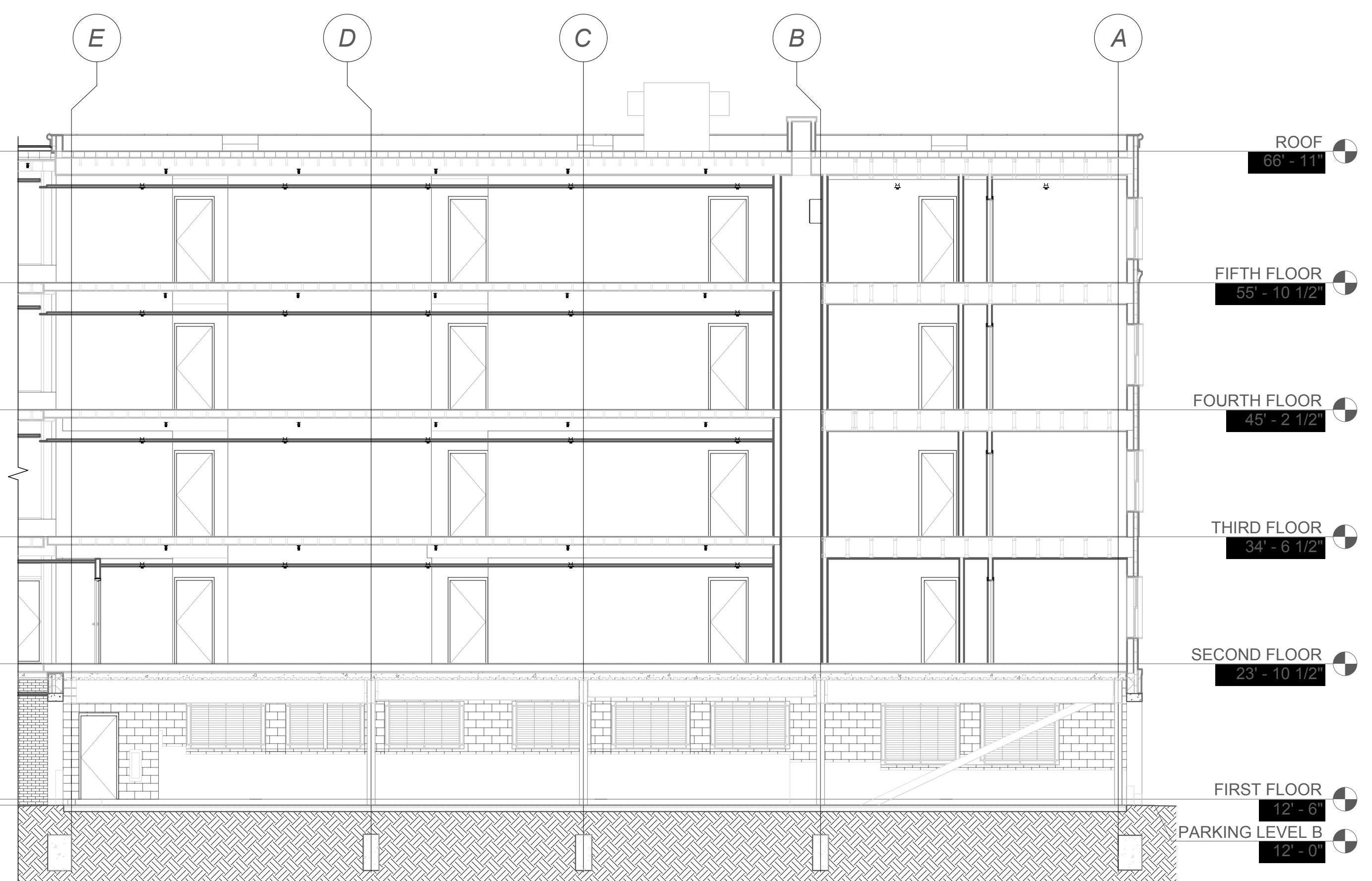


Typical Return Bend

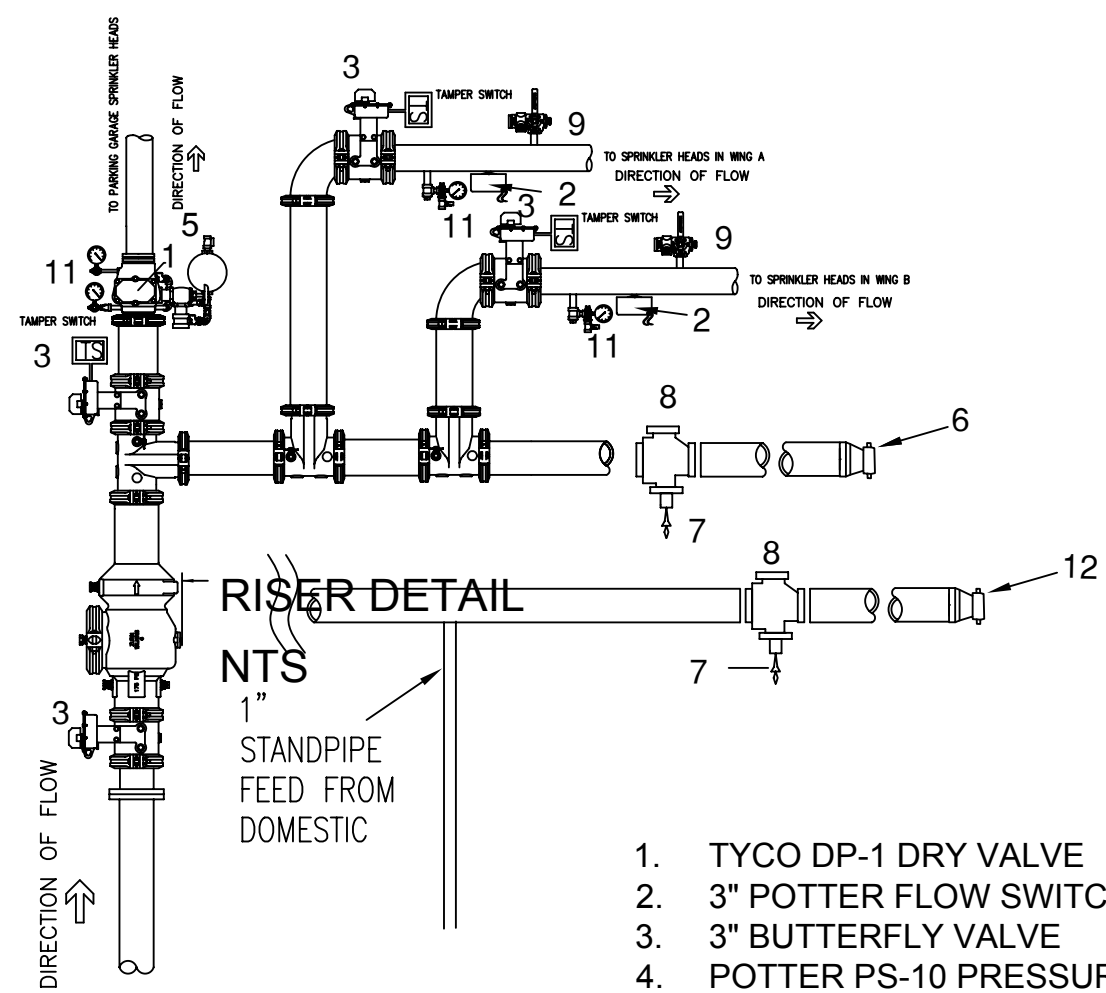


Dry System Auxiliary Drain
(PER NFPA 13)
N.T.S.

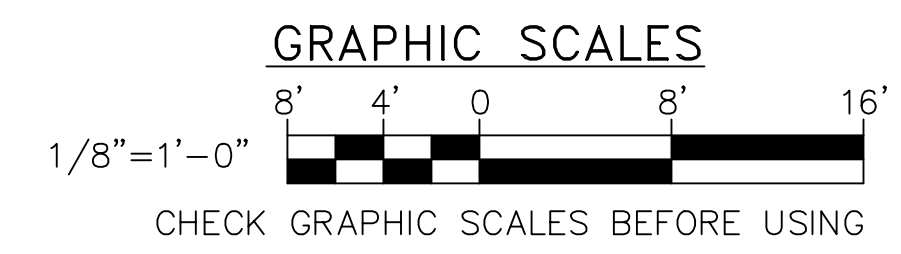
1. Valve Not Smaller than 3/4"
2. Nipple
3. Cap or Plug
(at least one shall be brass)
Auxiliary Drain



BUILDING SECTION - LONGITUDINAL B WING
1/8" = 1'-0" **D**



1. TYCO DP-1 DRY VALVE
2. 3" POTTER FLOW SWITCH
3. 3" BUTTERFLY VALVE
4. POTTER PS-10 PRESSURE SWITCH
5. RETARD CHAMBER
6. STORZ FDC
7. BRASS BALL DRIP
8. TYCO FDC/STANDPIPE CHECK VALVE
9. TEST AND DRAIN
10. 4" WILKINS BACKFLOW PREVENTER
11. PRESSURE GAUGE
12. STANDPIPE FEED



CHECK GRAPHIC SCALES BEFORE USING

GENERAL NOTES

ALL DIMENSIONS SHOWN ARE CENTER TO CENTER.
PIPE 2" AND SMALLER TO BE SCHEDULE 40 WITH THREADED CAST IRON FITTINGS.
PIPE 2 1/2" AND LARGER TO BE SCHEDULE 10 WITH GROOVED FITTINGS.

ALL PIPES AND HANGERS ARE TO BE INSTALLED PER NFPA 13, 2010.

HANGERS ARE TO BE U.L. LISTED AND F.M. APPROVED.

OWNER SHALL PROVIDE ADEQUATE HEAT TO PREVENT WET-PIPE SPRINKLER PIPING FROM FREEZING. OWNER SHALL MAINTAIN SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 25 AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.

THIS SYSTEM HAS BEEN DESIGNED BY AND SHALL BE INSTALLED BY MAINE FIRE PROTECTION SYSTEMS AND USE OF THESE DRAWINGS FOR OTHER PURPOSES IS STRICTLY PROHIBITED.

SYMBOL	DESCRIPTION
(C)	HYDRAULIC REFERENCE POINTS
[E]	ELEV. BELOW TOP OF STEEL
[+E]	ELEV. ABOVE FINISHED FLOOR
+ (TOB)	ELEV. OF TOP OF STEEL
(CH)	CEILING HEIGHT
(H)	DENOTES HANGER LOCATION
(R)	RISE UP OR DOWN

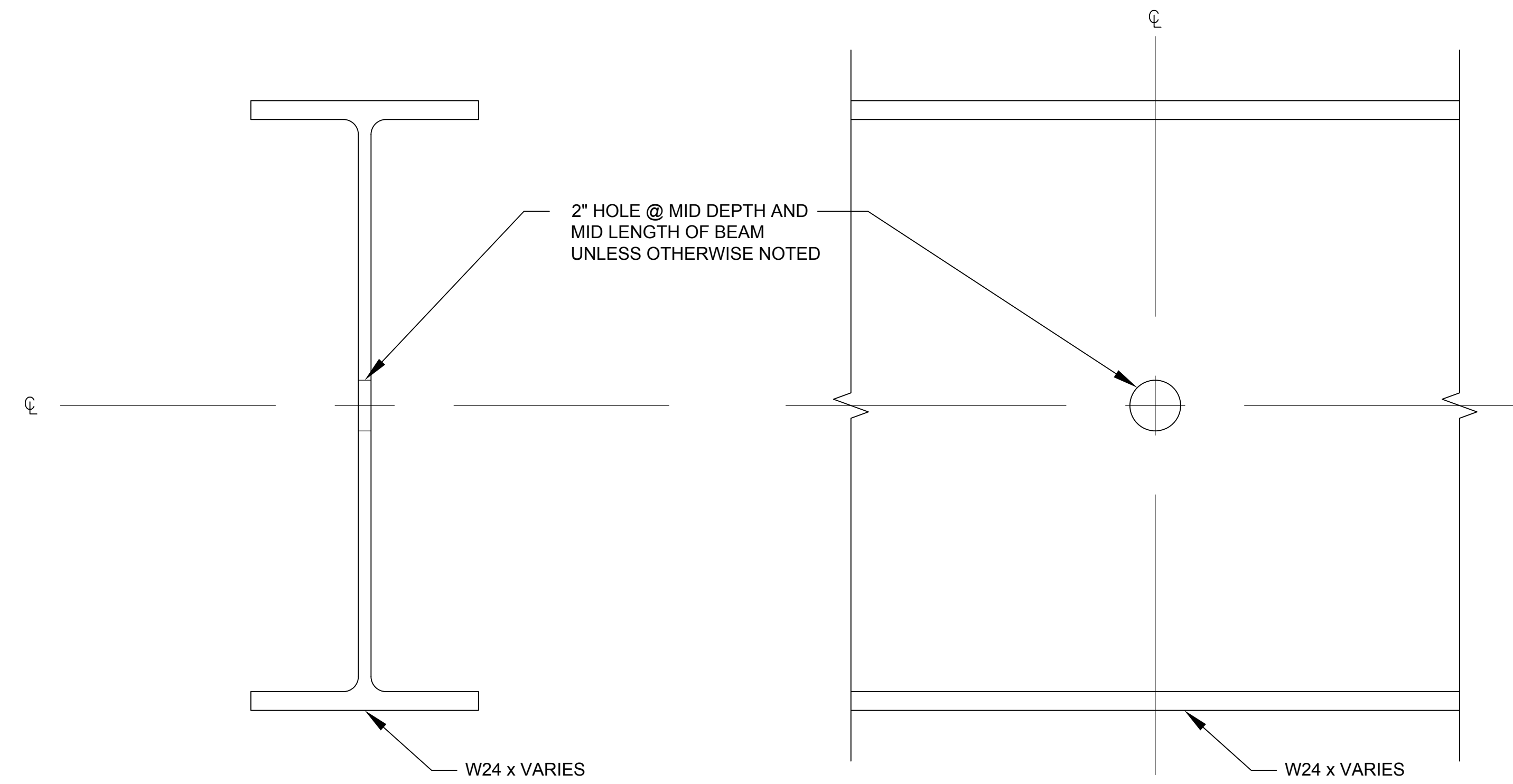
REVISIONS	DATE



SPRINKLER SYSTEM #		LOCATION:				
QTY	ORIFICE	MAKE	MODEL	TEMP	FINISH	NOTES

DRAWN BY	DATE	APPROVAL BY
DPW	04/16/2012	ST FIRE MARSHAL
FILE NAME	CONTRACTOR	
699.dwg	MAINE FIRE PROTECTION	
JOB NO.	6 DOWD ROAD	
0699	BANGOR, ME 04401	
JOB NAME	PEARL PLACE II	
	184 PEARL ST., PORTLAND, MAINE	
	SECTIONS & DETAILS	
1/8" = 1'-0"	SHEET 6 OF 7	

DATE PRINTED: 4/16/12



CORE HOLE DETAIL

GENERAL NOTES

ALL DIMENSIONS SHOWN ARE CENTER TO CENTER.

PIPE 2" AND SMALLER TO BE SCHEDULE 40 WITH THREADED CAST IRON FITTINGS.

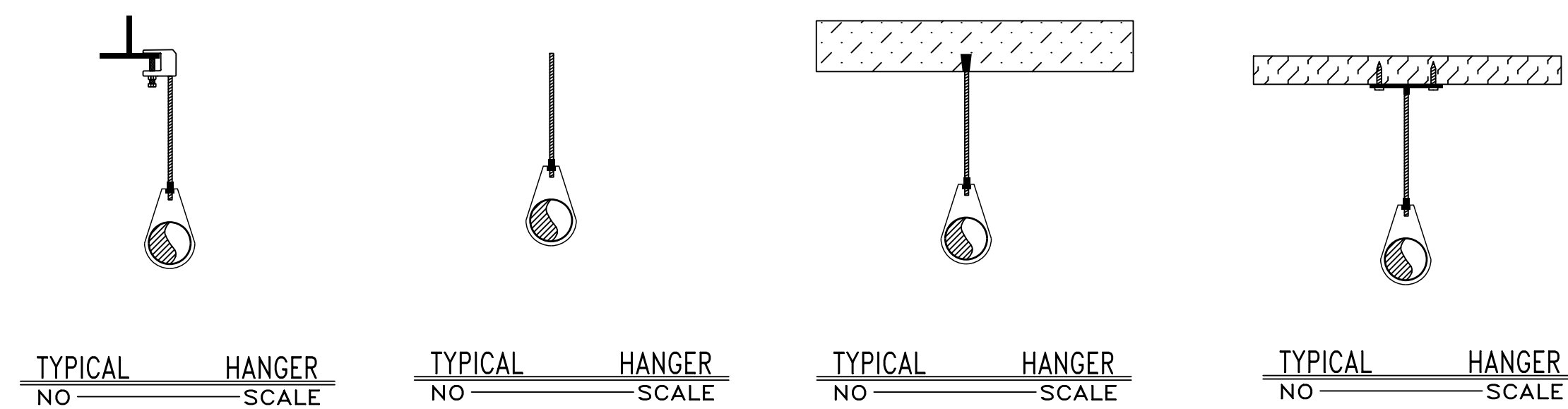
PIPE 2 1/2" AND LARGER TO BE SCHEDULE 10 WITH GROOVED FITTINGS.

ALL PIPES AND HANGERS ARE TO BE INSTALLED PER NFPA 13, 2010.

HANGERS ARE TO BE U.L. LISTED AND F.M. APPROVED.

OWNER SHALL PROVIDE ADEQUATE HEAT TO PREVENT WET-PIPE SPRINKLER PIPING FROM FREEZING. OWNER SHALL MAINTAIN SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 25 AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.

THIS SYSTEM HAS BEEN DESIGNED BY AND SHALL BE INSTALLED BY MAINE FIRE PROTECTION SYSTEMS AND USE OF THESE DRAWINGS FOR OTHER PURPOSES IS STRICTLY PROHIBITED.



TYPICAL HANGER NO. SCALE

- 1 -- All Thread Rod
- 1 -- Ring
- 1 -- Top Beam Clamp

TYPICAL HANGER NO. SCALE

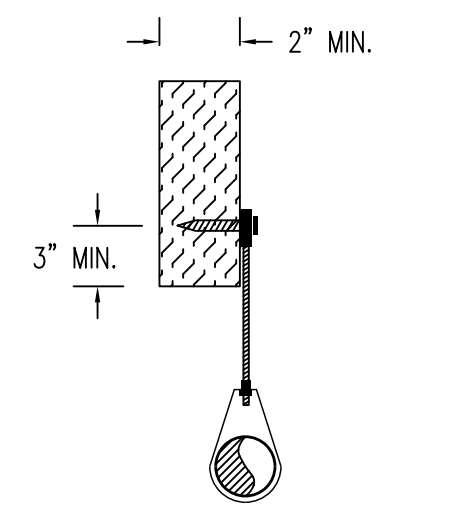
- 1 -- All Thread rod
- 1 -- Ring

TYPICAL HANGER NO. SCALE

- 1 -- All Thread Rod
- 1 -- Ring
- 1 -- HILLI Shield

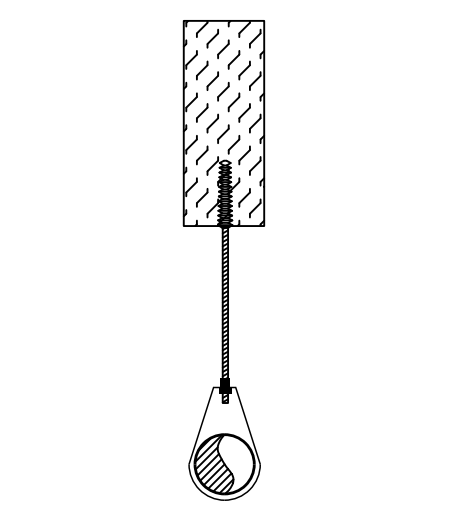
TYPICAL HANGER NO. SCALE

- 1 -- All Thread Rod
- 1 -- Ring
- 1 -- Ceiling Flange
- 2 -- #18 Wood Screws



TYPICAL HANGER NO. SCALE

- 1 -- All Thread Rod
- 1 -- Ring
- 1 -- Eye Socket
- 1 -- Drive Screw for 1" to 2" Pipe or Lag Bolt for 2 1/2" to 8" Pipe



TYPICAL HANGER NO. SCALE

- 1 -- Coach Screw Rod
- 1 -- Ring

SYMBOLS

SYMBOL	DESCRIPTION
()	HYDRAULIC REFERENCE POINTS
[]	ELEV. BELOW TOP OF STEEL
[*+]	ELEV. ABOVE FINISHED FLOOR
+ (108 120-0)	ELEV. OF TOP OF STEEL
⊙	CEILING HEIGHT
—	DENOTES HANGER LOCATION
○	RISE UP OR DOWN

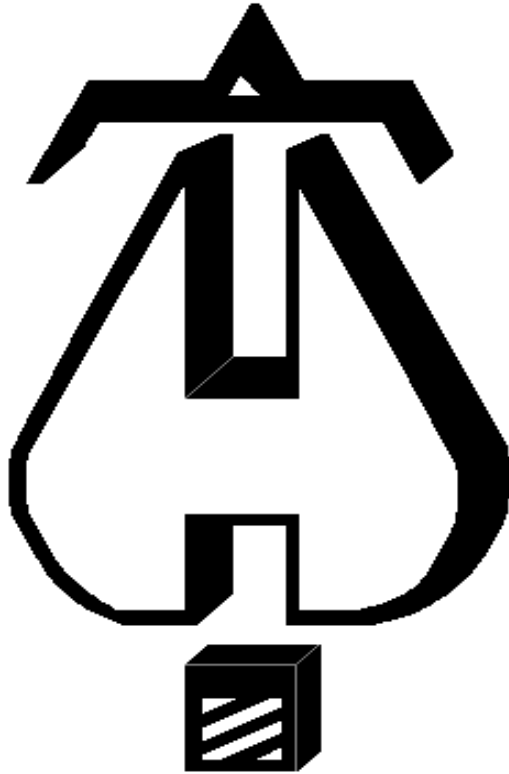
REVISIONS	DATE



SPRINKLER SYSTEM #		LOCATION:				NOTES
QTY	ORIFICE	MAKE	MODEL	TEMP	FINISH	

DRAWN BY	DATE	APPROVAL BY
DPW	04/16/2012	ST FIRE MARSHAL
FILE NAME	CONTRACTOR	
699.dwg	MAINE FIRE PROTECTION	
JOB NO.	6 DOWD ROAD	
0699	BANGOR, ME 04401	
JOB NAME	PEARL PLACE II	
	184 PEARL ST., PORTLAND, MAINE	
	DETAILS	
1/8" = 1'-0"	SHEET 7 OF 7	

DATE PRINTED: 4/16/12



. . . Fire Protection by Computer Design

Maine Fire Protection
P.O. Box 1050
Bangor, ME 04401
(207) 942-8809

Job Name : Pearl Place II Parking Garage
Drawing :
Location : 184 PEARL STREET, PORTLAND, ME
Remote Area : 2
Contract :
Data File : 1ST FLOOR PARKING GARAGE.WX2

HYDRAULIC CALCULATIONS
for

Project name: PEARL PLACE II
Location: 184 PEARL STREET, PORTLAND, ME
Drawing no:
Date: 4/12/12

Design

Remote area number: 2
Remote area location: FIRST FLOOR PARKING GARAGE DRY SYSTEM
Occupancy classification: ORDINARY HAZARD GROUP 1
Density: .15 - Gpm/SqFt
Area of application: 1998 - SqFt
Coverage per sprinkler: 121 - SqFt
Type of sprinklers calculated: TYCO QUICK RESPONSE UPRIGHTS
No. of sprinklers calculated: 13
In-rack demand: N/A - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 576 - GPM @ 44 - Psi
Type of system: DRY
Volume of dry or preaction system: 560 - Gal

Water supply information

Date: 1993
Location: OXFORD STREET PORTLAND, ME
Source: PORTLAND WATER DISTRICT

Name of contractor:

Address:

Phone number: 2079428809

Name of designer: chris maheux

Authority having jurisdiction: City of Portland, State of Maine Fire Marshall

Notes: (Include peaking information or gridded systems here.)

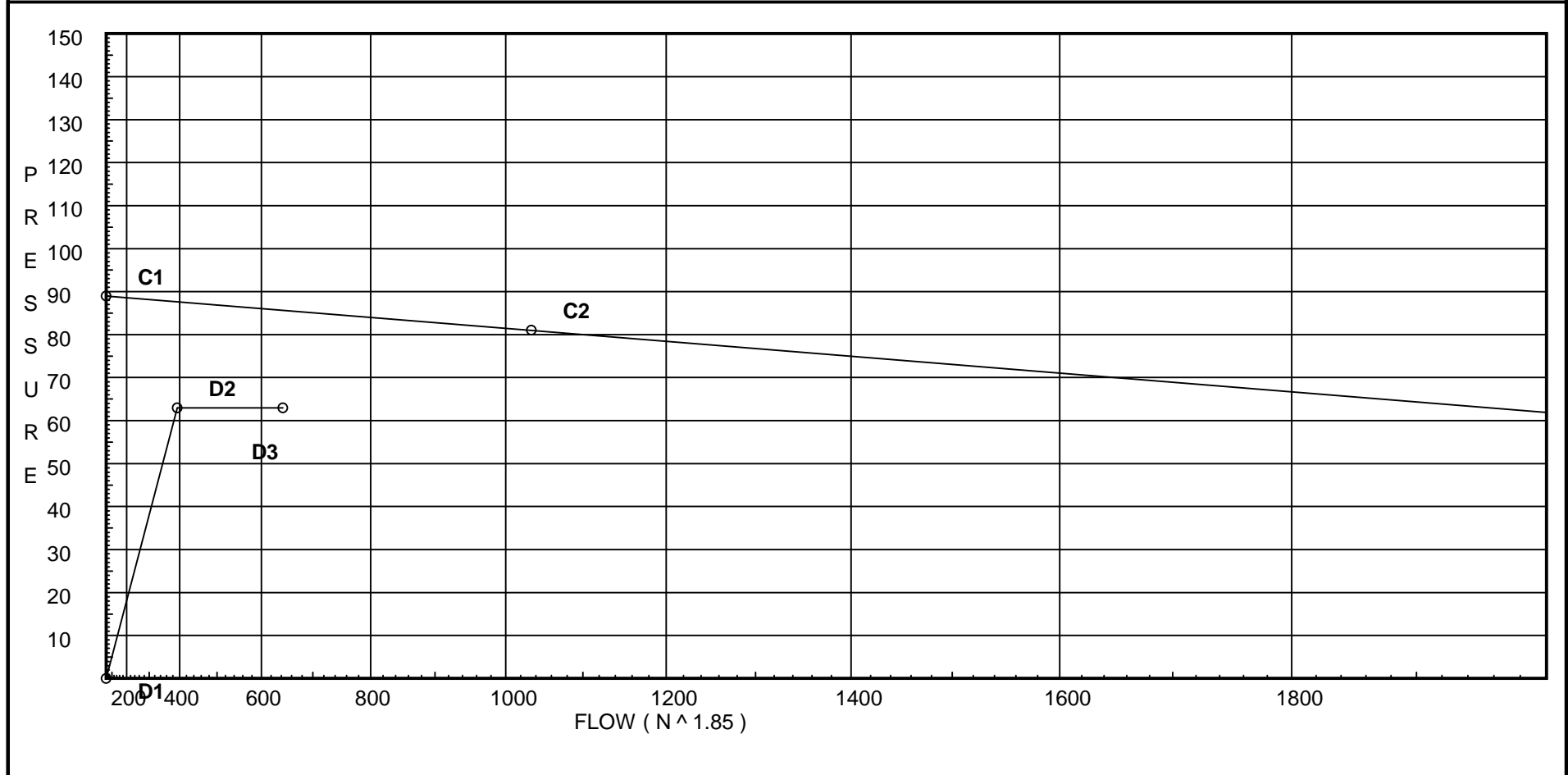
Water Supply Curve (C)

Maine Fire Protection
Pearl Place II Parking Garage

Page 2
Date 032712

City Water Supply:
C1 - Static Pressure : 89
C2 - Residual Pressure: 81
C2 - Residual Flow : 1034

Demand:
D1 - Elevation : -2.165
D2 - System Flow : 393.202
D2 - System Pressure : 62.946
Hose (Demand) : 250
D3 - System Demand : 643.202
Safety Margin : 22.730



Fittings Used Summary

Maine Fire Protection
 Pearl Place II Parking Garage

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 Date 032712

Fitting Legend

Abbrev.	Name	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	
Dge	Dry Gem DPV-1							2.2	4.9		8.9		22									
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61	
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121	
Zac	Ames 2000SS	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

Maine Fire Protection
 Pearl Place II Parking Garage

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 Date 032712

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
26	18.0	5.6	10.5	na	18.15	0.15	121	7.0
27	18.0	5.6	10.93	na	18.52	0.15	121	7.0
23	18.0	5.6	10.51	na	18.15	0.15	121	7.0
24	18.0	5.6	10.94	na	18.52	0.15	121	7.0
25	18.0		12.95	na				
21	18.0	5.6	16.1	na	22.47	0.15	121	7.0
22	18.0	5.6	16.59	na	22.81	0.15	121	7.0
20	18.0	5.6	18.82	na	24.29	0.15	64	7.0
18	18.0	5.6	17.01	na	23.1	0.15	121	7.0
19	18.0	5.6	17.75	na	23.59	0.15	121	7.0
17	18.0	5.6	18.6	na	24.15	0.15	121	7.0
14	18.0	5.6	14.79	na	21.54	0.15	121	7.0
15	18.0	5.6	15.25	na	21.87	0.15	121	7.0
16	18.0	5.6	16.92	na	23.03	0.15	121	7.0
7	18.0	5.6	15.96	na	22.37	0.15	121	7.0
8	18.0	5.6	16.45	na	22.71	0.15	121	7.0
9	18.0		18.34	na				
10	18.0		18.35	na				
11	18.0		18.5	na				
12	18.0		19.18	na				
13	18.0		19.55	na				
1	18.0	5.6	15.46	na	22.02	0.15	121	7.0
2	18.0	5.6	15.94	na	22.36	0.15	121	7.0
3	18.0	5.6	17.67	na	23.54	0.15	121	7.0
4	18.0		19.97	na				
5	18.0		20.07	na				
6	18.0		22.25	na				
TODR	18.0		58.86	na				
BOR	12.0		65.78	na				
W1	10.0		68.51	na				
TEST	23.0		62.95	na	250.0			

The maximum velocity is 15.73 and it occurs in the pipe between nodes 25 and 10

Final Calculations - Hazen-Williams

Maine Fire Protection
 Pearl Place II Parking Garage

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 Date 032712

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
26 to 27	18.15	1.38 100.0		0.0	10.710	10.504			K Factor = 5.60	
				0.0	0.0	0.0				
	18.15	0.0401		0.0	10.710	0.430			Vel = 3.89	
27 to 25	18.52	1.38 100.0	1E 1T	2.141 4.282	7.270 6.423	10.934	0.0		K Factor = 5.60	
	36.67	0.1472		0.0	13.693	2.015			Vel = 7.87	
	0.0 36.67						12.949		K Factor = 10.19	
23 to 24	18.15	1.38 100.0		0.0	10.700	10.510			K Factor = 5.60	
				0.0	0.0	0.0				
	18.15	0.0401		0.0	10.700	0.429			Vel = 3.89	
24 to 25	18.53	1.38 100.0	1E 1T	2.141 4.282	7.230 6.423	10.939	0.0		K Factor = 5.60	
	36.68	0.1472		0.0	13.653	2.010			Vel = 7.87	
25 to 10	36.66	1.38 100.0	1T	4.282	5.900	12.949	0.0			
	73.34	0.5306		0.0	10.182	5.403			Vel = 15.73	
	0.0 73.34						18.352		K Factor = 17.12	
21 to 22	22.47	1.38 100.0		0.0	8.220	16.103			K Factor = 5.60	
				0.0	0.0	0.0				
	22.47	0.0595		0.0	8.220	0.489			Vel = 4.82	
22 to 11	22.81	1.38 100.0	1T	4.282	4.470	16.592	0.0		K Factor = 5.60	
	45.28	0.2174		0.0	8.752	1.903			Vel = 9.71	
	0.0 45.28						18.495		K Factor = 10.53	
20 to 12	24.29	1.38 100.0	1T	4.282	1.020	18.820			K Factor = 5.60	
				0.0	4.282	0.0				
	24.29	0.0688		0.0	5.302	0.365			Vel = 5.21	
	0.0 24.29						19.185		K Factor = 5.55	
18 to 19	23.10	1.38 100.0		0.0	11.750	17.014			K Factor = 5.60	
				0.0	0.0	0.0				
	23.1	0.0626		0.0	11.750	0.735			Vel = 4.95	
19 to 13	23.59	1.38 100.0	1T	4.282	3.530	17.749	0.0		K Factor = 5.60	
	46.69	0.2302		0.0	7.812	1.798			Vel = 10.02	
	0.0 46.69						19.547		K Factor = 10.56	
17 to 13	24.15	1.38 100.0	1T	4.282	9.710	18.596			K Factor = 5.60	
				0.0	4.282	0.0				
	24.15	0.0680		0.0	13.992	0.951			Vel = 5.18	
	0.0 24.15						19.547		K Factor = 5.46	
14 to 15	21.54	1.38 100.0		0.0	8.290	14.794			K Factor = 5.60	
				0.0	0.0	0.0				
	21.54	0.0550		0.0	8.290	0.456			Vel = 4.62	

Final Calculations - Hazen-Williams

Maine Fire Protection
 Pearl Place II Parking Garage

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 Date 032712

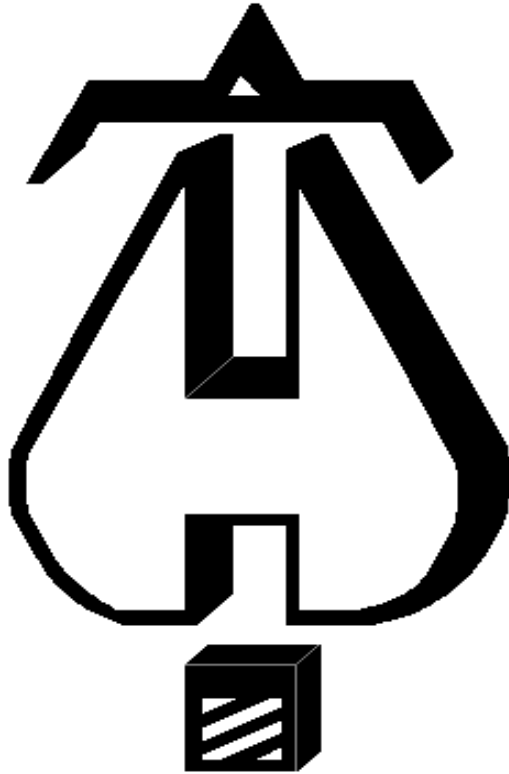
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
15 to 16	21.87 43.41	1.38 100.0 0.2011		0.0 0.0 0.0	8.290 0.0 8.290	15.250 0.0 1.667			K Factor = 5.60 Vel = 9.31	
16 to 5	23.03 66.44	1.38 100.0 0.4419	1T	4.282 0.0 0.0	2.860 4.282 7.142	16.917 0.0 3.156			K Factor = 5.60 Vel = 14.25	
	0.0 66.44					20.073			K Factor = 14.83	
7 to 8	22.37 22.37	1.38 100.0 0.0591		0.0 0.0 0.0	8.220 0.0 8.220	15.962 0.0 0.486			K Factor = 5.60 Vel = 4.80	
8 to 9	22.71 45.08	1.38 100.0 0.2156	1T	4.282 0.0 0.0	4.470 4.282 8.752	16.448 0.0 1.887			K Factor = 5.60 Vel = 9.67	
9 to 10	0.0 45.08	3.26 100.0 0.0033		0.0 0.0 0.0	5.200 0.0 5.200	18.335 0.0 0.017			Vel = 1.73	
10 to 11	73.35 118.43	3.26 100.0 0.0196		0.0 0.0 0.0	7.290 0.0 7.290	18.352 0.0 0.143			Vel = 4.55	
11 to 12	45.28 163.71	3.26 100.0 0.0357	2E	13.428 0.0 0.0	5.920 13.429 19.349	18.495 0.0 0.690			Vel = 6.29	
12 to 13	24.29 188.0	3.26 100.0 0.0459		0.0 0.0 0.0	7.880 0.0 7.880	19.185 0.0 0.362			Vel = 7.23	
13 to 6	70.85 258.85	3.26 100.0 0.0832	2E	13.428 0.0 0.0	19.060 13.429 32.489	19.547 0.0 2.702			Vel = 9.95	
	0.0 258.85					22.249			K Factor = 54.88	
1 to 2	22.02 22.02	1.38 100.0 0.0573		0.0 0.0 0.0	8.290 0.0 8.290	15.462 0.0 0.475			K Factor = 5.60 Vel = 4.72	
2 to 3	22.36 44.38	1.38 100.0 0.2094		0.0 0.0 0.0	8.290 0.0 8.290	15.937 0.0 1.736			K Factor = 5.60 Vel = 9.52	
3 to 4	23.54 67.92	1.38 100.0 0.4604	1E	2.141 0.0 0.0	2.850 2.141 4.991	17.673 0.0 2.298			K Factor = 5.60 Vel = 14.57	
4 to 5	0.0 67.92	3.26 100.0 0.0070		0.0 0.0 0.0	14.660 0.0 14.660	19.971 0.0 0.102			Vel = 2.61	
5 to 6	66.44 134.36	3.26 100.0 0.0247	2T	28.775 0.0 0.0	59.230 28.775 88.005	20.073 0.0 2.176			Vel = 5.16	
6 to TODR	258.84 393.2	3.26 120.0 0.1286	10E 1T 1Dge	94.077 20.159 6.585	163.830 120.821 284.651	22.249 0.0 36.613			Vel = 15.11	

Final Calculations - Hazen-Williams

Maine Fire Protection
 Pearl Place II Parking Garage

Page 7
 Date 032712

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TODR to BOR	0.0 393.2	4.26 120.0 0.0349	1E 1Zac	13.167 0.0 0.0	3.000 13.167 16.167	58.862 6.357 0.565		* Fixed loss = 3.758 Vel = 8.85	
BOR to W1	0.0 393.2	6.16 140.0 0.0044	2T	86.075 0.0 0.0	341.580 86.075 427.655	65.784 0.866 1.865		Vel = 4.23	
W1 to TEST	0.0 393.2	12.34 140.0 0.0001	1T	93.767 0.0 0.0	324.750 93.767 418.517	68.515 -5.630 0.061		Vel = 1.05	
	250.00 643.20					62.946		Qa = 250.00 K Factor = 81.07	



. . . Fire Protection by Computer Design

Maine Fire Protection
P.O. Box 1050
Bangor, ME 04401
(207) 942-8809

Job Name : Pearl Place II 5TH Floor
Drawing :
Location : 184 PEARL STREET, PORTLAND, ME
Remote Area : 1
Contract :
Data File : 5th floor.WX1

HYDRAULIC CALCULATIONS
for

Project name: PEARL PLACE II
Location: 184 PEARL STREET, PORTLAND, ME
Drawing no:
Date: 4/12/12

Design

Remote area number: 1
Remote area location: 5TH FLOOR
Occupancy classification: LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 1071 - SqFt
Coverage per sprinkler: VARIES - SqFt
Type of sprinklers calculated: TYCO QUICK RESPONSE
No. of sprinklers calculated: 16
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 382 - GPM @ 55 - Psi
Type of system: WET PIPE
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 1993
Location: OXFORD STREET, PORTLAND MAINE
Source: PORTLAND WATER DISTRICT

Name of contractor: MAINE FIRE PROTECTION
Address: 6 DOWD ROAD, BANGOR, ME 04401
Phone number: 2079428809
Name of designer: chris maheux
Authority having jurisdiction: City of Portland, State of Maine Fire Marshall
Notes: (Include peaking information or gridded systems here.)

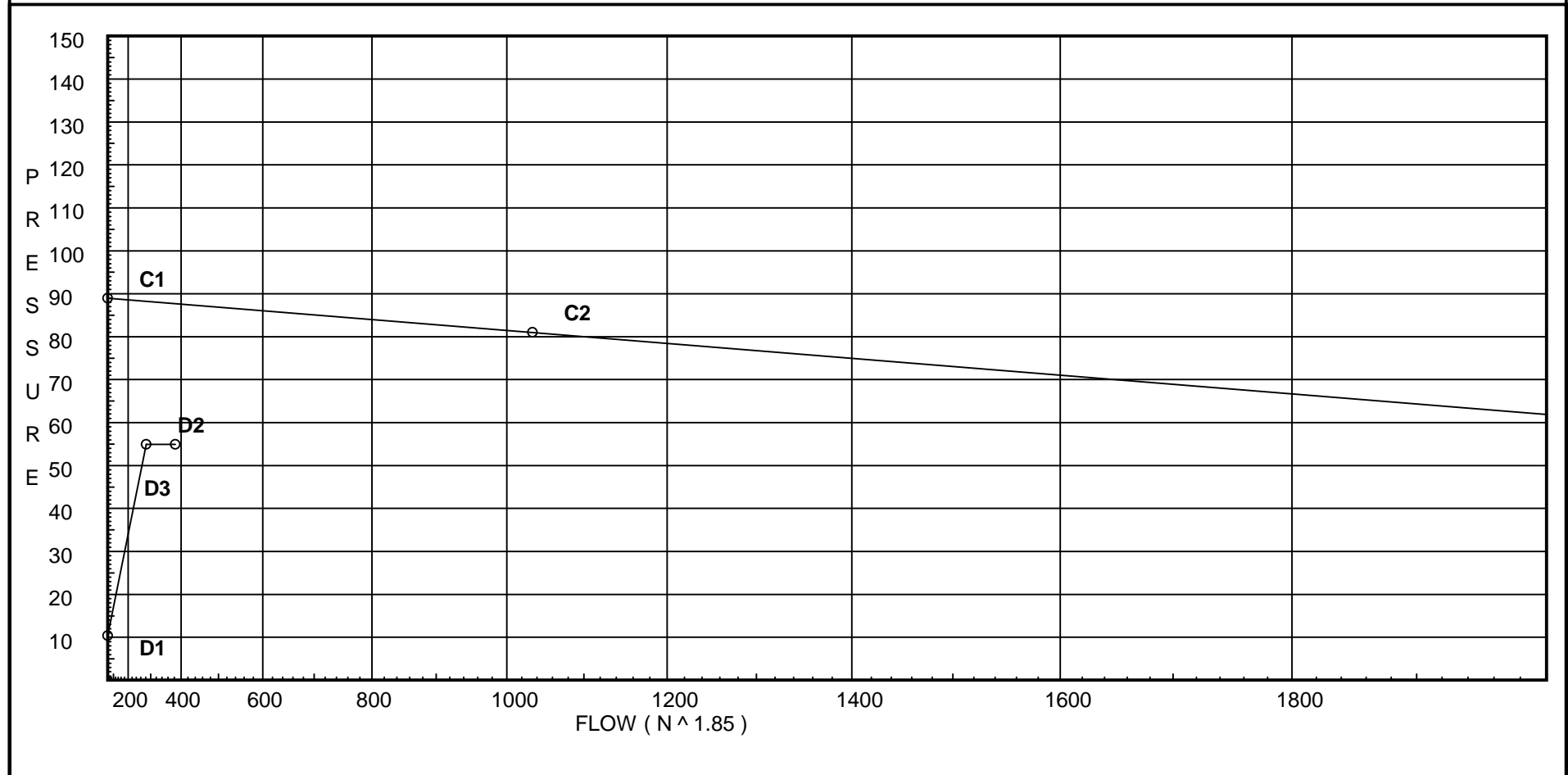
Water Supply Curve (C)

Maine Fire Protection
Pearl Place II 5TH Floor

Page 2
Date 032612

City Water Supply:
C1 - Static Pressure : 89
C2 - Residual Pressure: 81
C2 - Residual Flow : 1034

Demand:
D1 - Elevation : 10.394
D2 - System Flow : 282.699
D2 - System Pressure : 54.918
Hose (Demand) : 100
D3 - System Demand : 382.699
Safety Margin : 32.809



Fittings Used Summary

Maine Fire Protection
 Pearl Place II 5TH Floor

Page 3
 Date 032612

Fitting Legend

Abbrev.	Name	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
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	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

Maine Fire Protection
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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
D001	52.0	5.6	7.09	na	14.91	0.1	21	7.0
D002	52.0	5.6	10.47	na	18.12	0.1	116	7.0
D003	52.0	5.6	10.27	na	17.94	0.1	141	7.0
D004	52.0	5.6	7.0	na	14.82	0.1	21	7.0
D005	52.0	5.6	10.87	na	18.47	0.1	116	7.0
D006	52.0	5.6	7.19	na	15.02	0.1	80	7.0
D007	52.0	5.6	10.62	na	18.25	0.1	124	7.0
D008	52.0	5.6	10.58	na	18.22	0.1	10	7.0
D009	52.0	5.6	7.82	na	15.66	0.1	13	7.0
D010	52.0	5.6	7.94	na	15.78	0.1	84	7.0
D011	52.0	5.6	11.56	na	19.04	0.1	116	7.0
D012	52.0	5.6	9.1	na	16.89	0.1	4	7.0
D013	52.0	5.6	12.08	na	19.47	0.1	150	7.0
D014	52.0	5.6	11.12	na	18.67	0.1	63	7.0
D015	52.0	5.6	12.61	na	19.88	0.1	10	7.0
D016	52.0	5.6	14.82	na	21.56	0.1	84	7.0
29	52.0		7.22	na				
28	52.0		7.42	na				
27	52.0		8.06	na				
26	52.0		8.2	na				
25	52.0		9.39	na				
24	62.0		7.13	na				
23	62.0		6.62	na				
22	62.0		6.58	na				
21	62.0		8.13	na				
20	62.0		8.66	na				
13	52.0		7.31	na				
14	62.0		3.27	na				
15	62.0		3.54	na				
16	62.0		4.24	na				
17	62.0		4.44	na				
18	62.0		5.64	na				
19	62.0		7.77	na				
9	52.0		10.8	na				
10	62.0		7.22	na				
11	62.0		7.94	na				
12	62.0		11.39	na				
1	62.0		6.26	na				
2	62.0		7.32	na				
3	62.0		7.51	na				
4	62.0		8.89	na				
5	62.0		9.75	na				
6	62.0		13.94	na				
7	62.0		14.03	na				
8	62.0		14.55	na				
4F	62.0		24.4	na				
BF	18.0		47.04	na				
TOR	18.0		54.29	na				
BOR	12.0		60.86	na				
W1	10.0		62.68	na				
TEST	28.0		54.92	na	100.0			

The maximum velocity is 21.95 and it occurs in the pipe between nodes 19 and 7

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
D001 to 13	14.91 14.91	1.049 120.0 0.0757	1E	2.0 0.0 0.0	1.000 2.000 3.000	7.087 0.0 0.227			K Factor = 5.60 Vel = 5.53	
	0.0 14.91						7.314		K Factor = 5.51	
D002 to 9	18.12 18.12	1.049 120.0 0.1087	1E	2.0 0.0 0.0	1.000 2.000 3.000	10.474 0.0 0.326			K Factor = 5.60 Vel = 6.73	
	0.0 18.12						10.800		K Factor = 5.51	
D003 to 1	17.94 17.94	1.049 120.0 0.1063	1E	2.0 0.0 0.0	1.000 2.000 3.000	10.268 -4.331 0.319			K Factor = 5.60 Vel = 6.66	
	0.0 17.94						6.256		K Factor = 7.17	
D004 to 29	14.82 14.82	1.049 120.0 0.0747	1E	2.0 0.0 0.0	1.000 2.000 3.000	7.000 0.0 0.224			K Factor = 5.60 Vel = 5.50	
	0.0 14.82						7.224		K Factor = 5.51	
D005 to 10	18.47 18.47	1.049 120.0 0.1122	1T	5.0 0.0 0.0	1.000 5.000 6.000	10.873 -4.331 0.673			K Factor = 5.60 Vel = 6.86	
	0.0 18.47						7.215		K Factor = 6.88	
D006 to 28	15.02 15.02	1.049 120.0 0.0767	1E	2.0 0.0 0.0	1.000 2.000 3.000	7.192 0.0 0.230			K Factor = 5.60 Vel = 5.58	
	0.0 15.02						7.422		K Factor = 5.51	
D007 to 23	18.25 18.25	1.049 120.0 0.1097	1E	2.0 0.0 0.0	1.000 2.000 3.000	10.620 -4.331 0.329			K Factor = 5.60 Vel = 6.77	
	0.0 18.25						6.618		K Factor = 7.09	
D008 to 22	18.22 18.22	1.049 120.0 0.1093	1E	2.0 0.0 0.0	1.000 2.000 3.000	10.582 -4.331 0.328			K Factor = 5.60 Vel = 6.76	
	0.0 18.22						6.579		K Factor = 7.10	
D009 to 27	15.66 15.66	1.049 120.0 0.0827	1E	2.0 0.0 0.0	1.000 2.000 3.000	7.816 0.0 0.248			K Factor = 5.60 Vel = 5.81	
	0.0 15.66						8.064		K Factor = 5.51	
D010 to 26	15.78 15.78	1.049 120.0 0.0840	1E	2.0 0.0 0.0	1.000 2.000 3.000	7.944 0.0 0.252			K Factor = 5.60 Vel = 5.86	

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 15.78									
						8.196			K Factor = 5.51	
D011 to 11	19.04 19.04	1.049 120.0 0.1187	1T	5.0 0.0 0.0	1.000 5.000 6.000	11.557 -4.331 0.712			K Factor = 5.60	
	0.0 19.04									
						7.938			K Factor = 6.76	
D012 to 25	16.89 16.89	1.049 120.0 0.0953	1E	2.0 0.0 0.0	1.000 2.000 3.000	9.101 0.0 0.286			K Factor = 5.60	
	0.0 16.89									
						9.387			K Factor = 5.51	
D013 to 21	19.47 19.47	1.049 120.0 0.1237	1E	2.0 0.0 0.0	1.000 2.000 3.000	12.085 -4.331 0.371			K Factor = 5.60	
	0.0 19.47									
						8.125			K Factor = 6.83	
D014 to 24	18.67 18.67	1.049 120.0 0.1147	1E	2.0 0.0 0.0	1.000 2.000 3.000	11.119 -4.331 0.344			K Factor = 5.60	
	0.0 18.67									
						7.132			K Factor = 6.99	
D015 to 20	19.88 19.88	1.049 120.0 0.1287	1E	2.0 0.0 0.0	1.000 2.000 3.000	12.608 -4.331 0.386			K Factor = 5.60	
	0.0 19.88									
						8.663			K Factor = 6.75	
D016 to 12	21.56 21.56	1.049 120.0 0.1495	1T	5.0 0.0 0.0	1.000 5.000 6.000	14.823 -4.331 0.897			K Factor = 5.60	
	0.0 21.56									
						11.389			K Factor = 6.39	
29 to 14	14.82 14.82	1.097 120.0 0.0600	1T	6.217 0.0 0.0	0.080 6.217 6.297	7.224 -4.331 0.378				
	0.0 14.82									
						3.271			K Factor = 8.19	
28 to 15	15.02 15.02	1.097 120.0 0.0616	1T	6.217 0.0 0.0	1.010 6.217 7.227	7.422 -4.331 0.445				
	0.0 15.02									
						3.536			K Factor = 7.99	
27 to 16	15.66 15.66	1.097 120.0 0.0665	1T	6.217 0.0 0.0	1.450 6.217 7.667	8.064 -4.331 0.510				
	0.0 15.66									
						4.243			K Factor = 7.60	

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
26 to 17	15.78	1.097 120.0	1T	6.217	2.290 6.217	8.196 -4.331				
	15.78	0.0676		0.0	8.507	0.575		Vel =	5.36	
	0.0 15.78					4.440		K Factor =	7.49	
25 to 18	16.89	1.097 120.0	1T	6.217	1.450 6.217	9.387 -4.331				
	16.89	0.0766		0.0	7.667	0.587		Vel =	5.73	
	0.0 16.89					5.643		K Factor =	7.11	
24 to 19	18.67	1.097 120.0	1T	6.217	0.680 6.217	7.132 0.0				
	18.67	0.0921		0.0	6.897	0.635		Vel =	6.34	
	0.0 18.67					7.767		K Factor =	6.70	
23 to 2	18.25	1.097 120.0	1T	6.217	1.720 6.217	6.618 0.0				
	18.25	0.0884		0.0	7.937	0.702		Vel =	6.19	
	0.0 18.25					7.320		K Factor =	6.75	
22 to 3	18.22	1.097 120.0	1T	6.217	4.310 6.217	6.579 0.0				
	18.22	0.0881		0.0	10.527	0.927		Vel =	6.18	
	0.0 18.22					7.506		K Factor =	6.65	
21 to 4	19.47	1.097 120.0	1T	6.217	1.510 6.217	8.125 0.0				
	19.47	0.0995		0.0	7.727	0.769		Vel =	6.61	
	0.0 19.47					8.894		K Factor =	6.53	
20 to 5	19.88	1.097 120.0	1T	6.217	4.310 6.217	8.663 0.0				
	19.88	0.1035		0.0	10.527	1.090		Vel =	6.75	
	0.0 19.88					9.753		K Factor =	6.37	
13 to 14	14.91	1.097 120.0		0.0	4.750 0.0	7.314 -4.331				
	14.91	0.0606		0.0	4.750	0.288		Vel =	5.06	
14 to 15	14.81	1.442 120.0		0.0	4.600 0.0	3.271 0.0				
	29.72	0.0576		0.0	4.600	0.265		Vel =	5.84	
15 to 16	15.02	1.442 120.0		0.0	5.770 0.0	3.536 0.0				
	44.74	0.1225		0.0	5.770	0.707		Vel =	8.79	
16 to 17	15.66	1.442 120.0		0.0	0.920 0.0	4.243 0.0				
	60.4	0.2141		0.0	0.920	0.197		Vel =	11.87	

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
17	15.78	1.442		0.0	3.670	4.440				
to		120.0		0.0	0.0	0.0				
18	76.18	0.3278		0.0	3.670	1.203		Vel = 14.97		
18	16.90	1.442		0.0	4.470	5.643				
to		120.0		0.0	0.0	0.0				
19	93.08	0.4752		0.0	4.470	2.124		Vel = 18.29		
19	18.67	1.442	1T	7.432	1.970	7.767				
to		120.0		0.0	7.432	0.0				
7	111.75	0.6665		0.0	9.402	6.266		Vel = 21.95		
	0.0									
	111.75					14.033		K Factor = 29.83		
9	18.12	1.097		0.0	8.560	10.800				
to		120.0		0.0	0.0	-4.331				
10	18.12	0.0871		0.0	8.560	0.746		Vel = 6.15		
10	18.47	1.442		0.0	8.560	7.215				
to		120.0		0.0	0.0	0.0				
11	36.59	0.0845		0.0	8.560	0.723		Vel = 7.19		
11	19.04	1.442	2E	7.432	11.390	7.938				
to		120.0		0.0	7.432	0.0				
12	55.63	0.1833		0.0	18.822	3.451		Vel = 10.93		
12	21.56	1.442	1T	7.432	1.970	11.389				
to		120.0		0.0	7.432	0.0				
8	77.19	0.3361		0.0	9.402	3.160		Vel = 15.16		
	0.0									
	77.19					14.549		K Factor = 20.24		
1	17.94	1.097	1E	2.487	9.930	6.256				
to		120.0		0.0	2.487	0.0				
2	17.94	0.0857		0.0	12.417	1.064		Vel = 6.09		
2	18.25	1.442		0.0	2.250	7.320				
to		120.0		0.0	0.0	0.0				
3	36.19	0.0827		0.0	2.250	0.186		Vel = 7.11		
3	18.22	1.442		0.0	7.890	7.506				
to		120.0		0.0	0.0	0.0				
4	54.41	0.1759		0.0	7.890	1.388		Vel = 10.69		
4	19.47	1.442		0.0	2.770	8.894				
to		120.0		0.0	0.0	0.0				
5	73.88	0.3101		0.0	2.770	0.859		Vel = 14.51		
5	19.88	1.442	1T	7.432	1.260	9.753				
to		120.0		0.0	7.432	0.0				
6	93.76	0.4817		0.0	8.692	4.187		Vel = 18.42		
6	0.0	3.26		0.0	10.310	13.940				
to		120.0		0.0	0.0	0.0				
7	93.76	0.0090		0.0	10.310	0.093		Vel = 3.60		
7	111.75	3.26		0.0	13.330	14.033				
to		120.0		0.0	0.0	0.0				
8	205.51	0.0387		0.0	13.330	0.516		Vel = 7.90		
8	77.19	3.26	2E	18.815	122.130	14.549				
to		120.0		0.0	18.815	0.0				
4F	282.7	0.0699		0.0	140.945	9.847		Vel = 10.87		

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
4F to BF	0.0 282.7	3.26 120.0 0.0699	1E	9.408 0.0 0.0	42.000 9.408 51.408	24.396 19.056 3.592		Vel = 10.87	
BF to TOR	0.0 282.7	3.26 120.0 0.0699	4E 1Fsp	37.631 0.0 0.0	23.170 37.631 60.801	47.044 3.000 4.247		* Fixed loss = 3 Vel = 10.87	
TOR to BOR	0.0 282.7	4.26 120.0 0.0190	3E 1Zac	39.501 0.0 0.0	6.230 39.501 45.731	54.291 5.697 0.868		* Fixed loss = 3.098 Vel = 6.36	
BOR to W1	0.0 282.7	6.16 140.0 0.0024	1E 1T	20.084 43.037 0.0	341.570 63.121 404.691	60.856 0.866 0.959		Vel = 3.04	
W1 to TEST	0.0 282.7	12.34 140.0 0.0001	1T	93.767 0.0 0.0	324.730 93.767 418.497	62.681 -7.796 0.033		Vel = 0.76	
	100.00 382.70					54.918		Qa = 100.00 K Factor = 51.64	