



Northstar Realty Finance
399 Park Ave
New York, New York

Submittal #3
Hydraulic Calculations

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Prepared for:
Northstar Realty Finance



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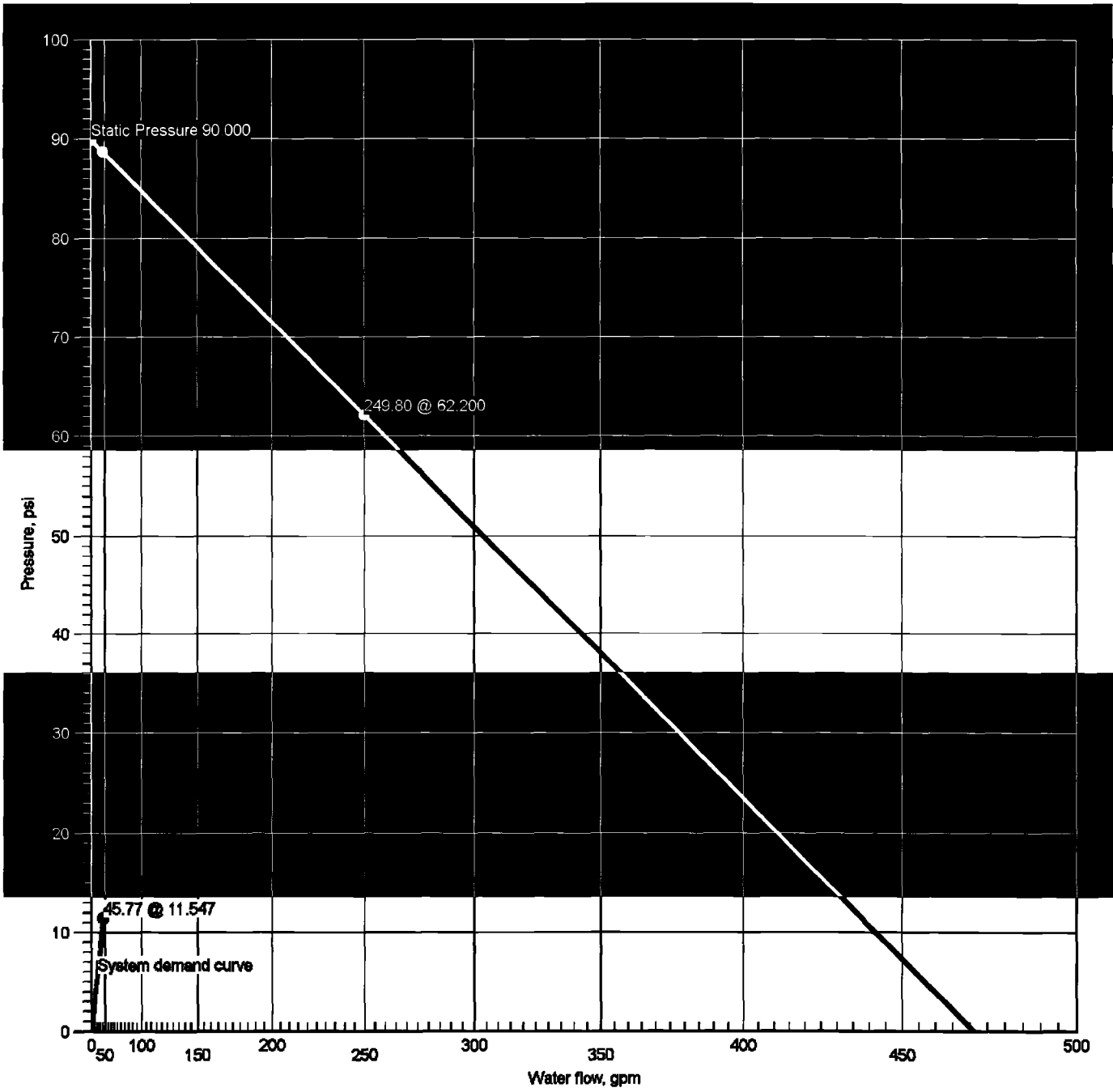


Hydraulic Summary

Job Number: 17320MG
Report Description: Light Hazard

Job											
Job Number 17320MG	Design Engineer J. Ubry										
Job Name Northstar Realty Finance	State Certification/License Number										
Address 1 399 Park Ave	AHJ										
Address 2 New York, New York	Job Site/Building 18th Floor										
Address 3	Drawing Name 17320MG sprink.cad										
System											
Most Demanding Sprinkler Data 5.6 K-Factor 14.82 at 7.000											
Hose Allowance At Source 0.00											
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>											
Total Hose Streams 0.00											
System Flow Demand 45.77	Total Water Required (Including Hose Allowance) 45.77										
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 16.99 between nodes 135 and 134											
Maximum Velocity Under Ground											
Volume capacity of Wet Pipes 185.41gal	Volume capacity of Dry Pipes										
Remote Area(s)											
Occupancy Light Hazard	Job Suffix										
Density 0.10gpm/ft ²	Area of Application 1500ft ² (Actual 108ft ²)										
Number Of Sprinklers Calculated 3	Coverage Per Sprinkler 130ft ²										
AutoPeak Results Pressure For Remote Area(s) Adjacent To Most Remote Area											
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply		90.000	62.200		249.80	88.796		45.77	11.547	77.249
Contractor											
Contractor Number		Contact Name				Contact Title					
Name of Contractor		Phone				Extension					
Address 1		FAX									
Address 2		E-mail									
Address 3		Web-Site									

Water Supply at Node 1



Hydraulic Graph	
Water Supply at Node 1	
Static Pressure	90.000
Residual Pressure	62.200 @ 249.80
Available Pressure at Time of Test	88.796 @ 45.77
System Demand	11.547 @ 45.77
System Demand (including Hose Allowance at Source)	11.547 @ 45.77



Summary Of Outflowing Devices

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Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
Sprinkler	396	15.28	13.00	5.6	7.441		
⇒ Sprinkler	409	14.82	13.00	5.6	7.000		
Sprinkler	410	15.68	13.00	5.6	7.842		

⇒ Most Demanding Sprinkler Data



Node Analysis

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Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	0'-0	S	11.547	45.77
396	0'-0	Spr(-7.441)	7.441	15.28
409	0'-0	Spr(-7.000)	7.000	14.82
410	0'-0	Spr(-7.842)	7.842	15.68
61	0'-0	T(12'-0)	11.513	
134	0'-0	C(5'-0)	8.376	
135	0'-0		8.561	
136	0'-0		9.666	
137	0'-0	PO(8'-0)	11.000	



Hydraulic Analysis

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Pipe Type	Diameter	Flow	Velocity	HWC	Pn	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt		Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
BL	1.0490	14.82	5.50	120		0.074703	16'-5"	Pf 1.376
409	0'-0"	14.82	5.6	7.000		Sprinkler,	2'-0"	Pe
134	0'-0"			8.376		E(2'-0")	18'-5"	Pv
BL	1.0490	45.77	16.99	120		0.602038	0'-3 1/2"	Pf 0.185
134	0'-0"	15.28 + 15.68		8.376		Flow (q) from Route 2 and 3		Pe
135	0'-0"			8.561			0'-3 1/2"	Pv
BL	1.3800	45.77	9.82	120		0.158339	6'-11 1/2"	Pf 1.105
135	0'-0"			8.561				Pe
136	0'-0"			9.666			6'-11 1/2"	Pv
BL	1.6100	45.77	7.21	120		0.074741	9'-10"	Pf 1.334
136	0'-0"			9.666			8'-0"	Pe
137	0'-0"			11.000		PO(8'-0")	17'-10"	Pv
CM	2.4690	16.70	1.12	120		0.001442	325'-11"	Pf 0.513
137	0'-0"			11.000			30'-0"	Pe
61	0'-0"			11.513		3E(6'-0"), T(12'-0")	355'-11"	Pv
CM	2.4690	45.77	3.07	120		0.009316	3'-7"	Pf 0.033
61	0'-0"	29.08		11.513		Flow (q) from Route 4		Pe
1	0'-0"			11.547		Water Supply	3'-7"	Pv
		0.00				Hose Allowance At Source		
1		45.77						
Route 2								
BL	1.0490	15.28	5.67	120		0.079049	6'-10"	Pf 0.935
396	0'-0"	15.28	5.6	7.441		Sprinkler,	5'-0"	Pe
134	0'-0"			8.376		C(5'-0")	11'-10"	Pv
Route 3								
BL	1.0490	15.68	5.82	120		0.082978	1'-5"	Pf 0.534
410	0'-0"	15.68	5.6	7.842		Sprinkler,	5'-0"	Pe
134	0'-0"			8.376		C(5'-0")	6'-5"	Pv
Route 4								
CM	2.4690	29.08	1.95	120		0.004024	109'-6 1/2"	Pf 0.513
137	0'-0"	16.70		11.000		Flow (q) from Route 1	18'-0"	Pe
61	0'-0"			11.513		E(6'-0"), T(12'-0")	127'-6 1/2"	Pv
Equivalent Pipe Lengths of Valves and Fittings (C=120 only)								
$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$				C Value Multiplier				
				Value Of C	100	130	140	150
				Multiplying Factor	0.713	1.16	1.33	1.51



Hydraulic Analysis

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Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream						Total Length	
Pipe Type Legend		Units Legend			Fittings Legend		
AO	Arm-Over	Diameter	Inch		ALV	Alarm Valve	
BL	Branch Line	Elevation	Foot		AngV	Angle Valve	
CM	Cross Main	Flow	gpm		b	Bushing	
DN	Drain	Discharge	gpm		BaIV	Ball Valve	
DR	Drop	Velocity	fps		BFP	Backflow Preventer	
DY	Dynamic	Pressure	psi		BV	Butterfly Valve	
FM	Feed Main	Length	Foot		C	Cross Flow Turn 90°	
FR	Feed Riser	Friction Loss	psi/Foot		cplg	Coupling	
MS	Miscellaneous	HWC	Hazen-Williams Constant		Cr	Cross Run	
OR	Outrigger	Pt	Total pressure at a point in a pipe		CV	Check Valve	
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe		DelV	Deluge Valve	
SP	Sprig	Pf	Pressure loss due to friction between points		DPV	Dry Pipe Valve	
ST	Stand Pipe	Pe	Pressure due to elevation difference between indicated points		E	90° Elbow	
UG	Underground	Pv	Velocity pressure at a point in a pipe		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	
					LtE	Long Turn Elbow	
					mecT	Mechanical Tee	
					Noz	Nozzle	
					P1	Pump In	
					P2	Pump Out	
					PIV	Post Indicating Valve	
					PO	Pipe Outlet	
					PrV	Pressure Relief Valve	
					PRV	Pressure Reducing Valve	
					red	Reducer/Adapter	
					S	Supply	
					sCV	Swing Check Valve	
					SFx	Seismic Flex	
					Spr	Sprinkler	
					St	Strainer	
					T	Tee Flow Turn 90°	
					Tr	Tee Run	
					U	Union	
					WirF	Wirsbo	
					WMV	Water Meter Valve	
					Z	Cap	



Hydraulic Calculator Messages

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The following list shows notification messages produced by the hydraulic flow calculator while analyzing the system.
"Warning" messages indicate unusual conditions that do not prevent the calculation of a hydraulic solution.
"Error" messages indicate severe conditions that result in incorrect hydraulic calculations.

Collecting data...
Calculating...
Done.