

PATRIOT FIRE PROTECTION



PATRIOT FIRE PROTECTION
2707 70TH AVE. EAST
TACOMA, WA 98424
253-284-3449

Job Name : Centeris Battery Replacement
Drawing : FP-02
Location : 1023 39TH AVE SE PUYALLUP, WA 98374
Remote Area : BATTERY 134
Contract : 18-0181C
Data File : Centeris Battery Replacement Area BATTERY 134.WXF
Date/Time : 10/17/2025 - 01:49 PM

Water Supply Curve

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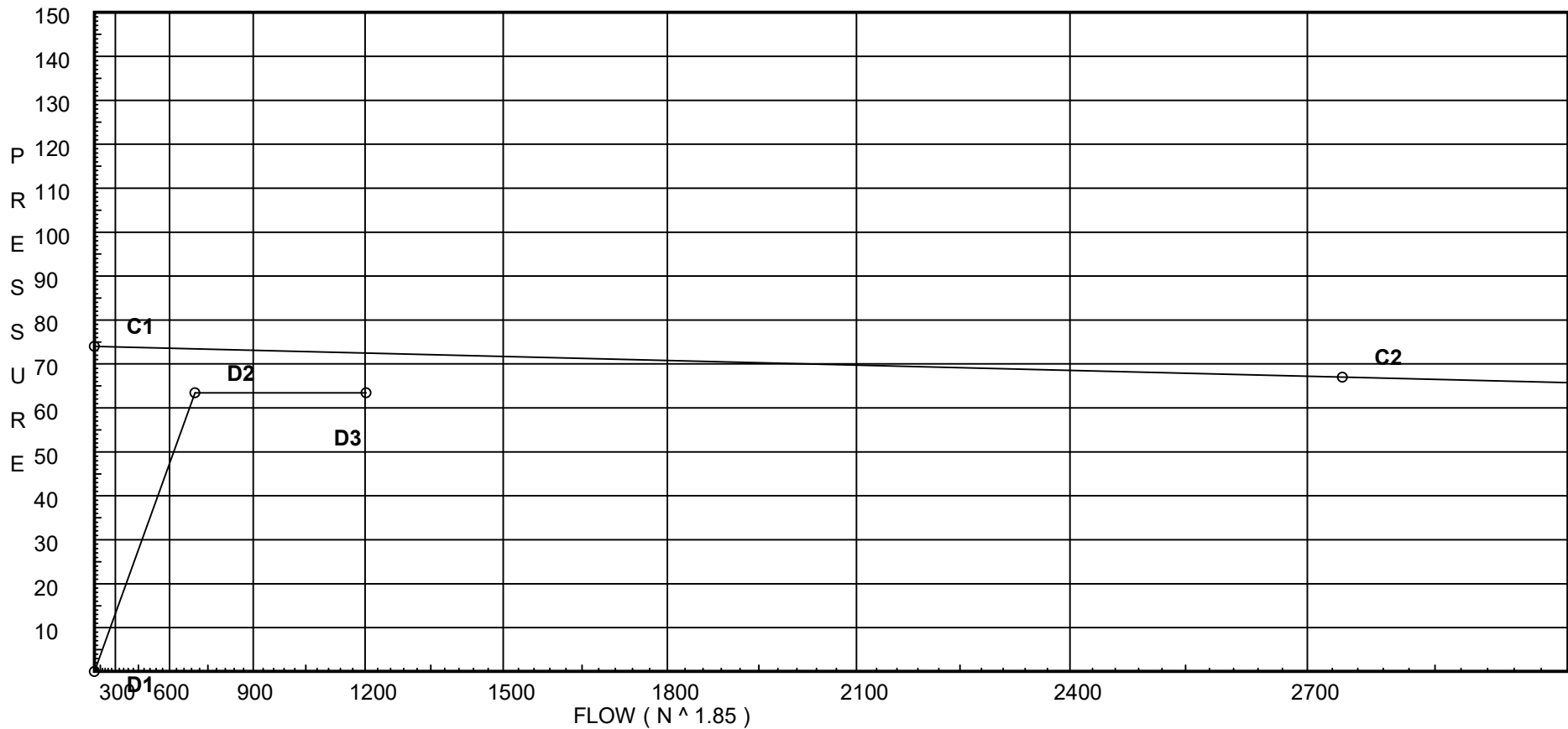
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City Water Supply:

C1 - Static Pressure : 74
C2 - Residual Pressure: 67
C2 - Residual Flow : 2742

Demand:

D1 - Elevation : -10.135
D2 - System Flow : 702.65
D2 - System Pressure : 63.429
Hose (Demand) : 500
D3 - System Demand : 1202.65
Safety Margin : 9.047



Fittings Used Summary

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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
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
D	Dry Valve Rel FX						10	11.4	13.2		23.5		37								
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
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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
Ziw	Wilkins 350AST	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.

Flow Summary - NFPA

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
SRC	74.0	67	2742.0	72.476	1202.65	63.429

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
H6	474.6	8	12.69	28.5	0.3	95
H7	474.56	8	12.81	28.63	0.3	95
H8	474.52	8	13.19	29.05	0.3	95
H9	474.48	8	13.98	29.91	0.3	95
H10	474.43	8	15.34	31.33	0.3	95
2	474.42		18.08			
3	474.4		18.38			
4	474.38		18.98			
5	474.38		19.29			
101	477.16		55.13			
100	477.26		56.15			
TOR	477.15		65.73			
DV	468.57		69.62			
FLG	466.21		72.48			
SRC	498.0		63.43	500.0		
H21	474.53	8	9.96	25.25	0.3	81
H22	474.48	8	10.32	25.7	0.3	81
H23	474.43	8	11.57	27.21	0.3	81
H24	474.38	8	14.29	30.24	0.3	81
6	474.36		19.28			
H1	474.61	8	12.63	28.43	0.3	93
H2	474.57	8	12.75	28.56	0.3	93
H3	474.53	8	13.13	28.98	0.3	93
H4	474.49	8	13.91	29.84	0.3	93
H5	474.45	8	15.26	31.25	0.3	93
1	474.44		18.0			
H11	474.58	8	12.9	28.74	0.3	95
H12	474.54	8	13.02	28.87	0.3	95
H13	474.5	8	13.41	29.29	0.3	95
H14	474.46	8	14.21	30.16	0.3	95
H15	474.41	8	15.59	31.59	0.3	95
H16	474.56	8	13.34	29.22	0.3	93
H17	474.52	8	13.46	29.35	0.3	93
H18	474.48	8	13.86	29.78	0.3	93
H19	474.44	8	14.68	30.66	0.3	93
H20	474.39	8	16.11	32.11	0.3	93

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
H6 to H7	474.6 474.56	8.00	28.50 28.5	2 2.157			9.500 9.500	100 0.0105	12.691 0.017 0.100		Vel = 2.50	
H7 to H8	474.56 474.52	8.00	28.63 57.13	2 2.157			9.500 9.500	100 0.0380	12.808 0.017 0.361		Vel = 5.02	
H8 to H9	474.52 474.48	8.00	29.05 86.18	2 2.157			9.500 9.500	100 0.0814	13.186 0.017 0.773		Vel = 7.57	
H9 to H10	474.48 474.43	8.00	29.91 116.09	2 2.157			9.500 9.500	100 0.1409	13.976 0.022 1.339		Vel = 10.19	
H10 to 2	474.43 474.42	8.00	31.33 147.42	2 2.157	T	8.783	3.710 8.783 12.493	100 0.2193	15.337 0.004 2.740		Vel = 12.94	
2 to 3	474.42 474.4		147.07 294.49	4 4.26			10.000 10.000	100 0.0287	18.081 0.009 0.287		Vel = 6.63	
3 to 4	474.4 474.38		148.65 443.14	4 4.26			9.750 9.750	100 0.0610	18.377 0.009 0.595		Vel = 9.97	
4 to 5	474.38 474.38		151.12 594.26	4 4.26			2.950 2.950	100 0.1051	18.981 0.0 0.310		Vel = 13.38	
5 to 101	474.38 477.16		108.40 702.66	4 4.26	6E T	56.384 18.795	183.210 75.179 258.389	100 0.1433	19.291 -1.204 37.039		Vel = 15.82	
101 to 100	477.16 477.26		0.0 702.66	6 6.357			52.520 52.520	100 0.0204	55.126 -0.043 1.072		Vel = 7.10	
100 to TOR	477.26 477.15		0.0 702.66	4 4.26	4E	37.589	28.850 37.589 66.439	100 0.1433	56.155 0.048 9.523		Vel = 15.82	
TOR to DV	477.15 468.57		0.0 702.66	6 6.357			8.580 8.580	100 0.0204	65.726 3.716 0.175		Vel = 7.10	
DV to FLG	468.57 466.21		0.0 702.66	6 6.357	D B E T	46.522 12.573 17.603 37.72	12.310 114.418 126.728	120 0.0146	69.617 1.022 1.846		Vel = 7.10	
FLG to SRC	466.21 498		0.0 702.66	8 8.27	3E 2G Ziw	85.404 12.652 0.0	105.010 98.056 203.066	140 0.0030	72.485 -9.674 0.618		* * Fixed Loss = 4.095 Vel = 4.20	
SRC			500.00 1202.66						63.429		Qa = 500.00 K Factor = 151.01	
H21 to H22	474.53 474.48	8.00	25.25 25.25	1.5 1.682			11.880 11.880	100 0.0281	9.963 0.022 0.334		Vel = 3.65	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
H22 to H23	474.48 474.43	8.00	25.70 50.95	1.5 1.682			11.870 11.870	100 0.1031	10.319 0.022 1.224		Vel = 7.36	
H23 to H24	474.43 474.38	8.00	27.21 78.16	1.5 1.682			11.880 11.880	100 0.2277	11.565 0.022 2.705		Vel = 11.29	
H24 to 6	474.38 474.36	8.00	30.24 108.4	1.5 1.682	T	7.065	4.880 7.066 11.946	100 0.4170	14.292 0.009 4.981		Vel = 15.65	
6 to 5	474.36 474.38		0.0 108.4	4 4.26			3.820 3.820	100 0.0047	19.282 -0.009 0.018		Vel = 2.44	
5			0.0 108.40						19.291		K Factor = 24.68	
H1 to H2	474.61 474.57	8.00	28.43 28.43	2 2.157			9.500 9.500	100 0.0105	12.632 0.017 0.100		Vel = 2.50	
H2 to H3	474.57 474.53	8.00	28.57 57.0	2 2.157			9.500 9.500	100 0.0379	12.749 0.017 0.360		Vel = 5.00	
H3 to H4	474.53 474.49	8.00	28.98 85.98	2 2.157			9.500 9.500	100 0.0808	13.126 0.017 0.768		Vel = 7.55	
H4 to H5	474.49 474.45	8.00	29.84 115.82	2 2.157			9.500 9.500	100 0.1404	13.911 0.017 1.334		Vel = 10.17	
H5 to 1	474.45 474.44	8.00	31.25 147.07	2 2.157	T	8.783	3.710 8.783 12.493	100 0.2184	15.262 0.004 2.729		Vel = 12.91	
1 to 2	474.44 474.42		0.0 147.07	4 4.26			9.750 9.750	100 0.0079	17.995 0.009 0.077		Vel = 3.31	
2			0.0 147.07						18.081		K Factor = 34.59	
H11 to H12	474.58 474.54	8.00	28.74 28.74	2 2.157			9.500 9.500	100 0.0106	12.905 0.017 0.101		Vel = 2.52	
H12 to H13	474.54 474.5	8.00	28.87 57.61	2 2.157			9.500 9.500	100 0.0386	13.023 0.017 0.367		Vel = 5.06	
H13 to H14	474.5 474.46	8.00	29.29 86.9	2 2.157			9.500 9.500	100 0.0825	13.407 0.017 0.784		Vel = 7.63	
H14 to H15	474.46 474.41	8.00	30.16 117.06	2 2.157			9.500 9.500	100 0.1432	14.208 0.022 1.360		Vel = 10.28	
H15 to 3	474.41 474.4	8.00	31.58 148.64	2 2.157	T	8.783	3.710 8.783 12.493	100 0.2228	15.590 0.004 2.783		Vel = 13.05	

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
3			0.0 148.64						18.377		K Factor = 34.67	
H16 to H17	474.56 474.52	8.00	29.22	2			9.500	100	13.342 0.017			
H17 to H18	474.52 474.48		29.22	2.157			9.500	0.0109	0.104		Vel = 2.57	
H17 to H18	474.52 474.48	8.00	29.35	2			9.500	100	13.463 0.017			
H18 to H19	474.48 474.44		58.57	2.157			9.500	0.0398	0.378		Vel = 5.14	
H18 to H19	474.48 474.44	8.00	29.79	2			9.500	100	13.858 0.017			
H19 to H20	474.44 474.39		88.36	2.157			9.500	0.0852	0.809		Vel = 7.76	
H19 to H20	474.44 474.39	8.00	30.65	2			9.500	100	14.684 0.022			
H20 to 4	474.39 474.38		119.01	2.157			9.500	0.1476	1.402		Vel = 10.45	
H20 to 4	474.39 474.38	8.00	32.11	2	T	8.783	3.710 8.783	100	16.108 0.004			
4			151.12	2.157			12.493	0.2296	2.869		Vel = 13.27	
4			0.0 151.12						18.981		K Factor = 34.69	