Vallejo Sanitation &
Flood Control District

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North Mare Island Business Park
Water, Sanitary Sewer, and Storm Drain Master Plans

8019.00-004
July 25, 2001

Prepared for
City of Vallejo
Mr. Sam Kumar
555 Santa Clara Street
Vallejo, California 94590

LFR REIMER

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ASSUMPTIONS FOR DESIGN OF THE WATER SUPPLY SYSTEM

LFR Reimer developed a model using WaterCAD pressure network analysis software (Haestad Methods).

The analysis assumes the water line crossing the Mare Island Strait at the southern end of the island and the line suspended under the Causeway are both closed. Water is supplied only from the existing 5.7 million-gallon tank located near the golf course on the southern end of the island.

The demand factors are based on 15 persons per acre and 152 gallons per capita per day.

The peak hourly factor is 1.6.

Fire flow is supplied at 4,500 gallons per minute available at any point on the island.

Fire flow at no less than 30 pounds per square inch gauge (psig) residual pressure is available within 150 feet of all structures. This assumes flow is from three separate hydrants surrounding the building with one hydrant connected directly to the street main the public right of way.

Each building has three water connections: potable water, irrigation water, and fire protection water.

All potable water connections have:

- a meter on the public easement side of the connection,
- a reduced pressure (R/P) backflow prevention valve within the private property of the landholder

All irrigation water connections have:

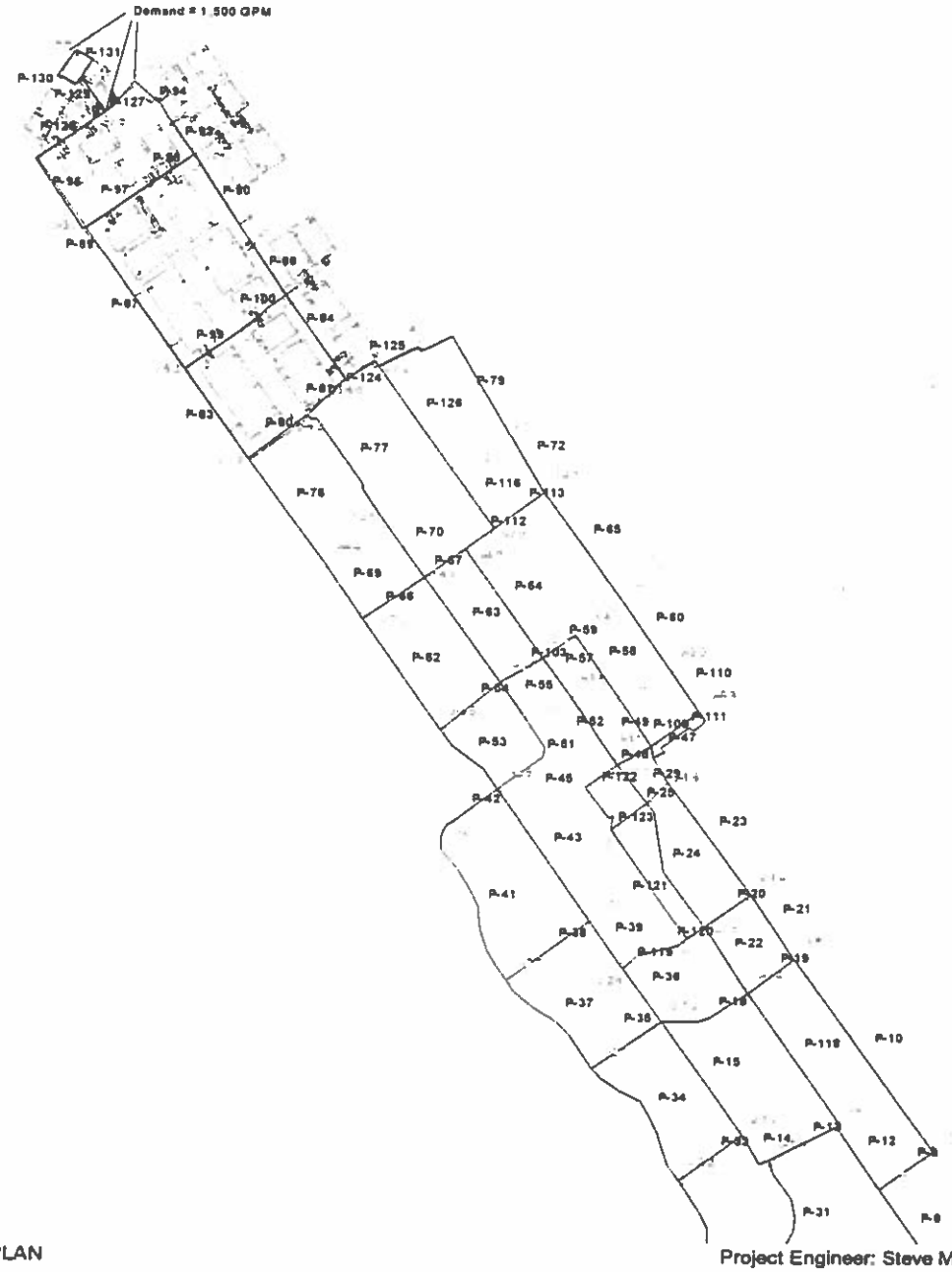
- a meter on the public easement side of the connection
- a double detector check valve backflow prevention apparatus within the private property of the landholder

All fire protection water connections have:

- a post indicator valve
- a fire department connection for the internal sprinkler system

Fire hydrants are spaced a maximum of 500' along the roadway.

Flow Analysis for Building F4



Scenario: Base
Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Total Upper Limit Flow (gpm)
J-1	100.00	Demand	126.95	Fixed	126.95	262.31	70.19	4,627.95
J-2	125.00	Demand	44.73	Fixed	44.73	262.29	59.37	4,545.73
J-3	125.00	Demand	44.76	Fixed	44.76	262.24	59.35	4,545.76
J-4	110.00	Demand	44.76	Fixed	44.76	262.22	65.83	4,545.76
J-5	110.00	Demand	44.73	Fixed	44.73	262.22	65.83	4,545.73
J-6	112.50	Demand	62.55	Fixed	62.55	262.34	64.79	4,563.55
J-7	111.00	Demand	29.44	Fixed	29.44	261.02	64.87	4,530.44
J-8	112.50	Demand	29.44	Fixed	29.44	257.14	62.55	4,530.44
J-9	112.50	Demand	62.55	Fixed	62.55	262.59	64.90	4,563.55
J-10	125.00	Demand	62.55	Fixed	62.55	273.69	64.30	4,563.55
J-11	120.00	Demand	72.86	Fixed	72.86	270.56	65.11	4,573.86
J-12	100.00	Demand	40.35	Fixed	40.35	259.71	69.07	4,541.35
J-13	112.00	Demand	29.44	Fixed	29.44	251.57	60.36	4,530.44
J-14	112.00	Demand	29.44	Fixed	29.44	257.18	62.78	4,530.44
J-15	112.00	Demand	69.96	Fixed	69.96	251.60	60.37	4,570.96
J-16	115.00	Demand	38.89	Fixed	38.89	241.35	54.64	4,539.89
J-17	125.00	Demand	76.07	Fixed	76.07	241.76	50.49	4,577.07
J-20	120.00	Demand	7.32	Fixed	7.31	237.46	50.79	4,508.31
J-21	185.00	Demand	33.12	Fixed	33.12	285.10	43.29	4,534.12
J-22	140.00	Demand	134.91	Fixed	134.90	271.77	56.98	4,635.91
J-23	125.00	Demand	94.51	Fixed	94.51	263.42	59.86	4,595.51
J-24	135.00	Demand	20.49	Fixed	20.49	252.73	50.91	4,521.49
J-25	120.00	Demand	122.89	Fixed	122.89	252.65	57.36	4,623.89
J-26	130.00	Demand	30.17	Fixed	30.17	250.17	51.97	4,531.17
J-27	120.00	Demand	35.57	Fixed	35.57	244.46	53.82	4,536.57
J-28	130.00	Demand	13.21	Fixed	13.21	239.86	47.51	4,514.21
J-29	125.00	Demand	17.11	Fixed	17.11	240.07	49.76	4,518.11
J-30	112.00	Demand	9.26	Fixed	9.26	235.43	53.38	4,510.26
J-31	120.00	Demand	18.89	Fixed	18.89	237.18	50.67	4,519.89
J-32	100.00	Demand	24.39	Fixed	24.39	236.12	58.86	4,525.39
J-33	120.00	Demand	35.37	Fixed	35.37	235.61	50.00	4,536.37
J-34	125.00	Demand	0.00	Fixed	0.00	235.65	47.85	4,501.00
J-35	120.00	Demand	20.33	Fixed	20.33	233.68	49.16	4,521.33
J-36	125.00	Demand	53.18	Fixed	53.18	233.68	47.00	4,554.18
J-37	100.00	Demand	33.92	Fixed	33.92	234.04	57.96	4,534.92
J-38	120.00	Demand	39.26	Fixed	39.26	234.66	49.58	4,540.26
J-39	112.00	Demand	14.90	Fixed	14.90	230.15	51.09	4,515.90
J-40	115.00	Demand	74.37	Fixed	74.37	224.23	47.23	4,575.37
J-41	117.00	Demand	46.82	Fixed	46.82	224.23	46.37	4,547.82
J-42	117.00	Demand	27.42	Fixed	27.42	224.23	46.37	4,528.42
J-43	112.00	Demand	15.11	Fixed	15.11	221.54	47.37	4,516.11
J-44	120.00	Demand	19.39	Fixed	19.39	219.45	43.01	4,520.39
J-45	120.00	Demand	30.66	Fixed	30.66	219.66	43.10	4,531.66
J-47	112.00	Demand	21.87	Fixed	21.87	219.26	46.38	4,522.87
J-48	110.00	Demand	24.58	Fixed	24.58	210.77	43.58	4,525.58
J-49	110.00	Demand	38.74	Fixed	38.74	210.63	43.52	4,539.74
J-50	110.00	Demand	41.91	Fixed	41.91	210.24	43.35	4,542.91
J-51	112.00	Demand	47.35	Fixed	47.35	214.15	44.17	4,548.35
J-52	110.00	Demand	25.97	Fixed	25.97	202.79	40.13	4,526.97
J-53	110.00	Demand	59.63	Fixed	59.63	202.66	40.07	4,560.63

Scenario: Base
Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Total Upper Limit Flow (gpm)
J-55	100.00	Demand	39.82	Fixed	39.82	197.18	42.02	4,540.82
J-56	110.00	Demand	47.94	Fixed	47.94	200.89	39.30	4,548.94
J-57	110.00	Demand	60.84	Fixed	60.84	196.99	37.62	4,561.84
J-58	110.00	Demand	44.90	Fixed	44.90	197.05	37.64	4,545.90
J-60	110.00	Demand	37.49	Fixed	37.49	195.64	37.03	4,538.49
J-61	110.00	Demand	1,526.00	Fixed	1,526.00	194.31	36.46	6,027.00
J-62	110.00	Demand	62.67	Fixed	62.67	194.11	36.37	4,563.67
J-64	110.00	Demand	40.58	Fixed	40.58	202.71	40.09	4,541.58
J-63	110.00	Demand	54.76	Fixed	54.76	197.02	37.63	4,555.76
J-66	125.00	Demand	32.70	Fixed	32.70	241.67	50.45	4,533.70
J-69	112.00	Demand	0.00	Fixed	0.00	236.59	53.88	4,501.00
J-70	116.00	Demand	0.00	Fixed	0.00	221.50	45.62	4,501.00
J-72	116.00	Demand	0.00	Fixed	0.00	218.74	44.43	4,501.00
J-73	112.00	Demand	29.44	Fixed	29.44	251.60	60.37	4,530.44
J-74	110.00	Demand	0.00	Fixed	0.00	213.76	44.87	4,501.00
J-75	110.00	Demand	1,500.00	Fixed	1,500.00	193.87	36.27	6,001.00
J-76	110.00	Demand	0.00	Fixed	0.00	190.85	34.96	4,501.00
J-77	110.00	Demand	1,500.00	Fixed	1,500.00	188.58	33.98	6,001.00

Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-63	1,152.00	12	Cast iron	100.0	0.85
P-59	342.00	12	PVC	120.0	0.00
P-64	1,177.00	12	Cast iron	100.0	0.85
P-103	437.00	12	PVC	120.0	1.00
P-65	1,196.00	10	Cast iron	100.0	0.70
P-66	650.00	12	PVC	120.0	1.78
P-69	601.00	12	PVC	120.0	0.70
P-67	439.00	12	PVC	120.0	1.00
P-70	589.00	12	Cast iron	100.0	1.00
P-112	302.00	12	Cast iron	100.0	1.78
P-72	593.00	10	PVC	120.0	0.70
P-76	1,144.00	12	PVC	120.0	0.70
P-77	1,202.00	12	Cast iron	100.0	2.40
P-79	1,358.00	10	PVC	120.0	3.23
P-80	653.00	12	Cast iron	100.0	2.18
P-83	983.00	12	Transite	100.0	0.70
P-81	465.00	20	Cast iron	100.0	1.70
P-84	917.00	16	PVC	120.0	1.00
P-124	351.00	14	Cast iron	100.0	2.40
P-87	1,281.00	12	Cast iron	100.0	0.35
P-99	645.00	16	PVC	120.0	1.78
P-88	567.00	20	PVC	120.0	0.35
P-89	240.00	16	PVC	120.0	0.35
P-90	914.00	20	Cast iron	100.0	0.50
P-97	679.00	16	PVC	120.0	1.63
P-93	372.00	20	Cast iron	100.0	0.50
P-94	475.00	20	PVC	120.0	0.80
P-127	374.00	20	PVC	120.0	2.08
P-96	748.00	12	PVC	120.0	1.15
P-100	460.00	16	PVC	120.0	1.78
P-98	498.00	16	PVC	120.0	0.85
P-121	1,183.00	8	Cast iron	100.0	2.08
P-122	881.00	12	Cast iron	100.0	4.96
P-123	395.00	10	Cast iron	100.0	1.30
P-110	471.00	12	PVC	120.0	1.30
P-113	542.00	12	Cast iron	100.0	1.78
P-116	598.00	14	Cast iron	100.0	1.78
P-120	179.00	12	Cast iron	100.0	1.83
P-125	394.00	14	Cast iron	100.0	2.40
P-126	1,159.00	14	Cast iron	100.0	1.00
P-128	738.00	20	PVC	120.0	2.08
P-129	367.00	12	PVC	120.0	2.56
P-130	512.00	10	PVC	120.0	3.68
P-131	360.00	10	PVC	120.0	2.88

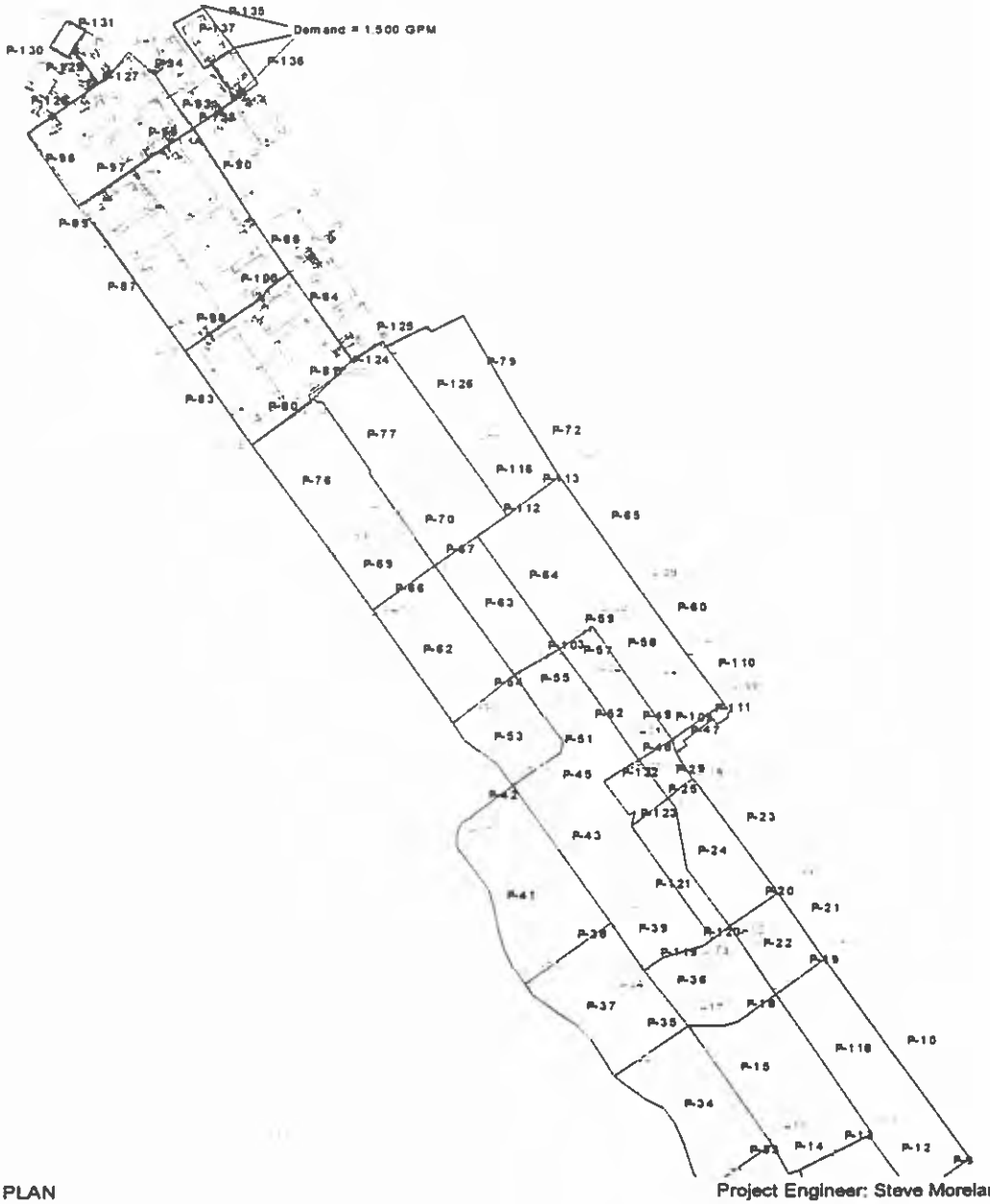
Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-2	1,344.00	20	PVC	120.0	0.55
P-8	983.00	20	PVC	120.0	2.56
P-3	1,465.00	20	PVC	120.0	1.68
P-4	668.00	12	PVC	120.0	2.43
P-30	1,248.00	20	PVC	120.0	0.63
P-5	616.00	10	PVC	120.0	2.08
P-6	1,853.00	10	PVC	120.0	1.60
P-7	2,481.00	12	PVC	120.0	1.20
P-9	583.00	12	PVC	120.0	2.08
P-12	675.00	20	PVC	120.0	1.15
P-10	2,106.00	12	PVC	120.0	0.00
P-13	652.00	12	Ductile Iro	100.0	0.00
P-118	1,469.00	12	Cast iron	100.0	2.60
P-14	387.00	12	Cast iron	100.0	1.50
P-15	1,235.00	12	Cast iron	100.0	0.70
P-18	818.00	12	PVC	120.0	2.66
P-36	597.00	12	Cast iron	100.0	0.85
P-20	502.00	10	Cast iron	100.0	2.56
P-21	691.00	10	Ductile Iro	100.0	0.70
P-23	1,219.00	10	Cast iron	100.0	0.70
P-19	513.00	12	PVC	120.0	1.63
P-22	700.00	12	PVC	120.0	0.00
P-24	1,240.00	12	PVC	120.0	1.20
P-29	258.00	10	Cast iron	100.0	0.70
P-25	263.00	10	Cast iron	100.0	1.78
P-45	428.00	12	PVC	120.0	0.85
P-47	111.00	12	PVC	120.0	0.00
P-111	750.00	10	Cast iron	100.0	5.96
P-31	1,356.00	16	PVC	120.0	2.13
P-32	1,668.00	16	PVC	120.0	1.63
P-33	679.00	8	Cast iron	100.0	2.56
P-34	1,300.00	16	PVC	120.0	0.70
P-35	754.00	12	PVC	120.0	2.56
P-37	1,113.00	12	PVC	120.0	0.70
P-39	507.00	12	Cast iron	100.0	0.70
P-119	641.00	12	Cast iron	100.0	1.83
P-38	890.00	8	Cast iron	100.0	2.56
P-41	1,317.00	12	PVC	120.0	0.70
P-43	1,424.00	12	Cast iron	100.0	1.63
P-42	753.00	12	PVC	120.0	0.85
P-51	857.00	12	Cast iron	100.0	2.58
P-53	743.00	12	PVC	120.0	0.85
P-48	333.00	8	Cast iron	100.0	0.00
P-52	756.00	12	Cast iron	100.0	0.85
P-60	722.00	10	Cast iron	100.0	0.00
P-49	461.00	12	PVC	120.0	1.00
P-109	527.00	12	PVC	120.0	1.30
P-58	727.00	12	PVC	120.0	0.00
P-57	400.00	12	PVC	120.0	0.00
P-54	661.00	8	Cast iron	130.0	2.56
P-62	1,174.00	12	PVC	120.0	0.70
P-55	432.00	12	Cast iron	100.0	0.70

Scenario: Base
Steady State Analysis
MARE ISLAND TANK REPORT

Node Label	Base Elevation (ft)	Minimum Level (ft)	Initial Level (ft)	Maximum Level (ft)	Inactive Volume (ft^3)	Tank Diameter (ft)	Tank Inflow (gpm)	Current Status	Calculated Hydraulic Grade (ft)	Tank Level (ft)
T-1	285.00	6.20	12.20	31.20	802,000.00	200.00	-7,119.22	Draining	297.20	12.20

Flow Analysis for Building C1



Scenario: Base
Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Total Upper Limit Flow (gpm)
J-1	100.00	Demand	126.95	Fixed	126.95	262.31	70.19	4,627.95
J-2	125.00	Demand	44.73	Fixed	44.73	262.29	59.37	4,545.73
J-3	125.00	Demand	44.76	Fixed	44.76	262.24	59.35	4,545.76
J-4	110.00	Demand	44.76	Fixed	44.76	262.22	65.83	4,545.76
J-5	110.00	Demand	44.73	Fixed	44.73	262.22	65.83	4,545.73
J-6	112.50	Demand	62.55	Fixed	62.55	262.34	64.79	4,563.55
J-7	111.00	Demand	29.44	Fixed	29.44	261.02	64.87	4,530.44
J-8	112.50	Demand	29.44	Fixed	29.44	257.14	62.55	4,530.44
J-9	112.50	Demand	62.55	Fixed	62.55	262.59	64.90	4,563.55
J-10	125.00	Demand	62.55	Fixed	62.55	273.69	64.30	4,563.55
J-11	120.00	Demand	72.86	Fixed	72.86	270.56	65.11	4,573.86
J-12	100.00	Demand	40.35	Fixed	40.35	259.71	69.07	4,541.35
J-13	112.00	Demand	29.44	Fixed	29.44	251.57	60.36	4,530.44
J-14	112.00	Demand	29.44	Fixed	29.44	257.18	62.78	4,530.44
J-15	112.00	Demand	69.96	Fixed	69.96	251.60	60.37	4,570.96
J-16	115.00	Demand	38.89	Fixed	38.89	241.35	54.64	4,539.89
J-17	125.00	Demand	76.07	Fixed	76.07	241.76	50.49	4,577.07
J-20	120.00	Demand	7.32	Fixed	7.31	237.46	50.79	4,508.31
J-21	185.00	Demand	33.12	Fixed	33.12	285.10	43.29	4,534.12
J-22	140.00	Demand	134.91	Fixed	134.90	271.77	56.98	4,635.91
J-23	125.00	Demand	94.51	Fixed	94.51	263.42	59.86	4,595.51
J-24	135.00	Demand	20.49	Fixed	20.49	252.73	50.91	4,521.49
J-25	120.00	Demand	122.89	Fixed	122.89	252.65	57.36	4,623.89
J-26	130.00	Demand	30.17	Fixed	30.17	250.17	51.97	4,531.17
J-27	120.00	Demand	35.57	Fixed	35.57	244.46	53.82	4,536.57
J-28	130.00	Demand	13.21	Fixed	13.21	239.86	47.51	4,514.21
J-29	125.00	Demand	17.11	Fixed	17.11	240.07	49.76	4,518.11
J-30	112.00	Demand	9.26	Fixed	9.26	235.43	53.38	4,510.26
J-31	120.00	Demand	18.89	Fixed	18.89	237.18	50.67	4,519.89
J-32	100.00	Demand	24.39	Fixed	24.39	236.12	58.86	4,525.39
J-33	120.00	Demand	35.37	Fixed	35.37	235.61	50.00	4,536.37
J-34	125.00	Demand	0.00	Fixed	0.00	235.65	47.85	4,501.00
J-35	120.00	Demand	20.33	Fixed	20.33	233.68	49.16	4,521.33
J-36	125.00	Demand	53.18	Fixed	53.18	233.68	47.00	4,554.18
J-37	100.00	Demand	33.92	Fixed	33.92	234.04	57.96	4,534.92
J-38	120.00	Demand	39.26	Fixed	39.26	234.66	49.58	4,540.26
J-39	112.00	Demand	14.90	Fixed	14.90	230.15	51.09	4,515.90
J-40	115.00	Demand	74.37	Fixed	74.37	224.23	47.23	4,575.37
J-41	117.00	Demand	46.82	Fixed	46.82	224.23	46.37	4,547.82
J-42	117.00	Demand	27.42	Fixed	27.42	224.23	46.37	4,528.42
J-43	112.00	Demand	15.11	Fixed	15.11	221.54	47.37	4,516.11
J-44	120.00	Demand	19.39	Fixed	19.39	219.45	43.01	4,520.39
J-45	120.00	Demand	30.66	Fixed	30.66	219.66	43.10	4,531.66
J-47	112.00	Demand	21.87	Fixed	21.87	219.26	46.38	4,522.87
J-48	110.00	Demand	24.58	Fixed	24.58	210.77	43.58	4,525.58
J-49	110.00	Demand	38.74	Fixed	38.74	210.63	43.52	4,539.74
J-50	110.00	Demand	41.91	Fixed	41.91	210.24	43.35	4,542.91
J-51	112.00	Demand	47.35	Fixed	47.35	214.15	44.17	4,548.35
J-52	110.00	Demand	25.97	Fixed	25.97	202.80	40.13	4,526.97
J-53	110.00	Demand	59.63	Fixed	59.63	202.65	40.07	4,560.63

Scenario: Base
Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Total Upper Limit Flow (gpm)
J-55	100.00	Demand	39.82	Fixed	39.82	197.46	42.15	4,540.82
J-56	110.00	Demand	47.94	Fixed	47.94	200.86	39.29	4,548.94
J-57	110.00	Demand	60.84	Fixed	60.84	197.29	37.75	4,561.84
J-58	110.00	Demand	44.90	Fixed	44.90	196.97	37.61	4,545.90
J-60	110.00	Demand	37.49	Fixed	37.49	196.97	37.61	4,538.49
J-61	110.00	Demand	26.00	Fixed	26.00	196.98	37.61	4,527.00
J-62	110.00	Demand	62.67	Fixed	62.67	197.01	37.62	4,563.67
J-64	110.00	Demand	40.58	Fixed	40.58	202.71	40.09	4,541.58
J-63	110.00	Demand	54.76	Fixed	54.76	197.09	37.66	4,555.76
J-66	125.00	Demand	32.70	Fixed	32.70	241.67	50.45	4,533.70
J-69	112.00	Demand	0.00	Fixed	0.00	236.59	53.88	4,501.00
J-70	116.00	Demand	0.00	Fixed	0.00	221.50	45.62	4,501.00
J-72	116.00	Demand	0.00	Fixed	0.00	218.74	44.43	4,501.00
J-73	112.00	Demand	29.44	Fixed	29.44	251.60	60.37	4,530.44
J-74	110.00	Demand	0.00	Fixed	0.00	213.76	44.87	4,501.00
J-75	110.00	Demand	0.00	Fixed	0.00	196.99	37.62	4,501.00
J-76	110.00	Demand	0.00	Fixed	0.00	196.99	37.62	4,501.00
J-77	110.00	Demand	0.00	Fixed	0.00	196.99	37.62	4,501.00
J-78	110.00	Demand	1,500.00	Fixed	1,500.00	191.93	35.43	6,001.00
J-79	110.00	Demand	1,500.00	Fixed	1,500.00	170.29	26.07	6,001.00
J-80	110.00	Demand	1,500.00	Fixed	1,500.00	173.51	27.47	6,001.00

Scenario: Base
Steady State Analysis
MARE ISLAND TANK REPORT

Node Label	Base Elevation (ft)	Minimum Level (ft)	Initial Level (ft)	Maximum Level (ft)	Inactive Volume (ft^3)	Tank Diameter (ft)	Tank Inflow (gpm)	Current Status	Calculated Hydraulic Grade (ft)	Tank Level (ft)
T-1	285.00	6.20	12.20	31.20	802,000.00	200.00	-7,119.22	Draining	297.20	12.20

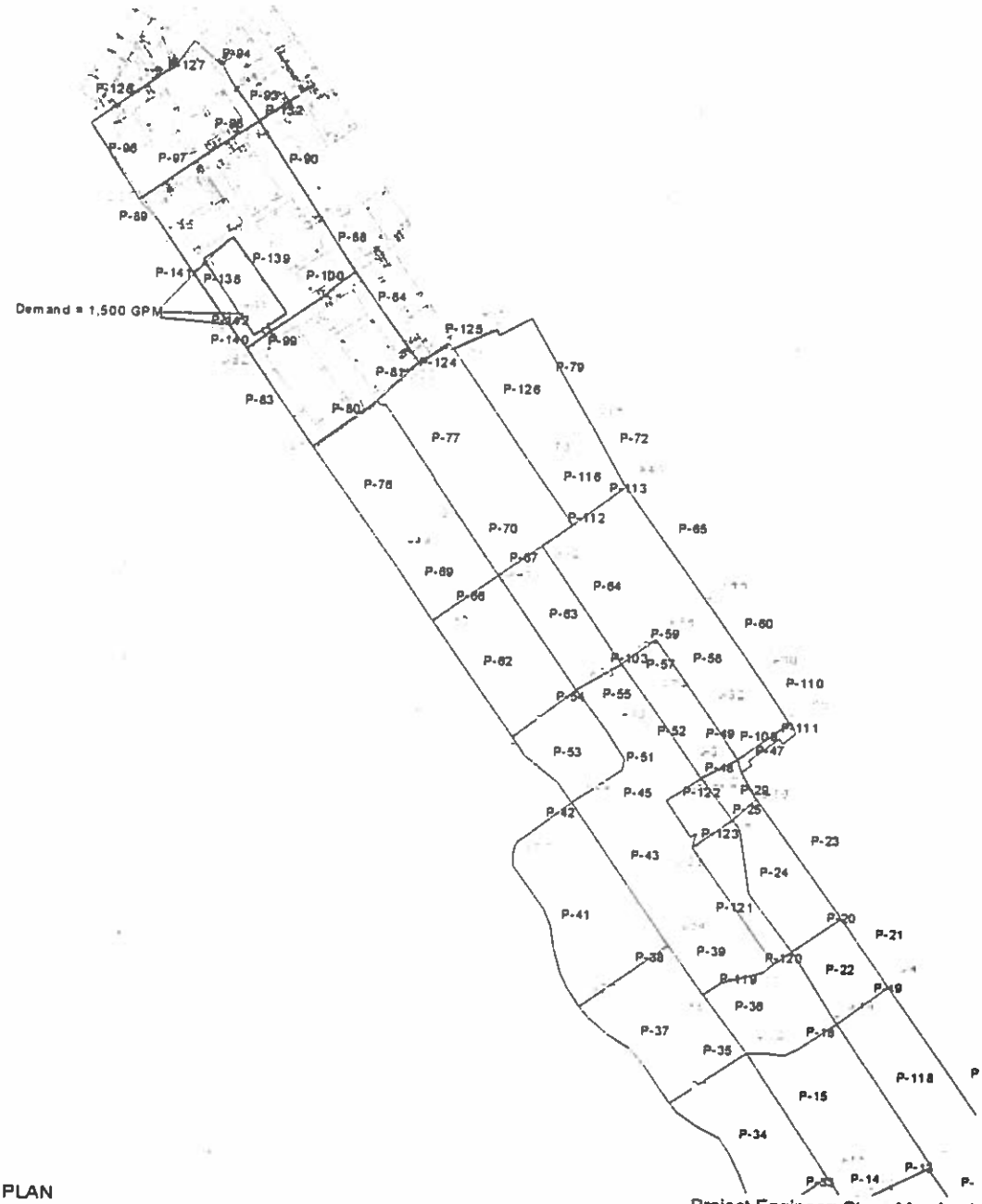
Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-2	1,344.00	20	PVC	120.0	0.55
P-8	983.00	20	PVC	120.0	2.56
P-3	1,465.00	20	PVC	120.0	1.68
P-4	668.00	12	PVC	120.0	2.43
P-30	1,248.00	20	PVC	120.0	0.63
P-5	616.00	10	PVC	120.0	2.08
P-6	1,853.00	10	PVC	120.0	1.60
P-7	2,481.00	12	PVC	120.0	1.20
P-9	583.00	12	PVC	120.0	2.08
P-12	675.00	20	PVC	120.0	1.15
P-10	2,106.00	12	PVC	120.0	0.00
P-13	652.00	12	Ductile Irc	100.0	0.00
P-118	1,469.00	12	Cast iron	100.0	2.60
P-14	387.00	12	Cast iron	100.0	1.50
P-15	1,235.00	12	Cast iron	100.0	0.70
P-18	818.00	12	PVC	120.0	2.66
P-36	597.00	12	Cast iron	100.0	0.85
P-20	502.00	10	Cast iron	100.0	2.56
P-21	691.00	10	Ductile Irc	100.0	0.70
P-23	1,219.00	10	Cast iron	100.0	0.70
P-19	513.00	12	PVC	120.0	1.63
P-22	700.00	12	PVC	120.0	0.00
P-24	1,240.00	12	PVC	120.0	1.20
P-29	258.00	10	Cast iron	100.0	0.70
P-25	263.00	10	Cast iron	100.0	1.78
P-45	428.00	12	PVC	120.0	0.85
P-47	111.00	12	PVC	120.0	0.00
P-111	750.00	10	Cast iron	100.0	5.96
P-31	1,356.00	16	PVC	120.0	2.13
P-32	1,668.00	16	PVC	120.0	1.63
P-33	679.00	8	Cast iron	100.0	2.56
P-34	1,300.00	16	PVC	120.0	0.70
P-35	754.00	12	PVC	120.0	2.56
P-37	1,113.00	12	PVC	120.0	0.70
P-39	507.00	12	Cast iron	100.0	0.70
P-119	641.00	12	Cast iron	100.0	1.83
P-38	890.00	8	Cast iron	100.0	2.56
P-41	1,317.00	12	PVC	120.0	0.70
P-43	1,424.00	12	Cast iron	100.0	1.63
P-42	753.00	12	PVC	120.0	0.85
P-51	857.00	12	Cast iron	100.0	2.58
P-53	743.00	12	PVC	120.0	0.85
P-48	333.00	8	Cast iron	100.0	0.00
P-52	756.00	12	Cast iron	100.0	0.85
P-60	722.00	10	Cast iron	100.0	0.00
P-49	461.00	12	PVC	120.0	1.00
P-109	527.00	12	PVC	120.0	1.30
P-58	727.00	12	PVC	120.0	0.00
P-57	400.00	12	PVC	120.0	0.00
P-54	661.00	8	Cast iron	130.0	2.56
P-62	1,174.00	12	PVC	120.0	0.70
P-55	432.00	12	Cast iron	100.0	0.70

Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-63	1,152.00	12	Cast iron	100.0	0.85
P-59	342.00	12	PVC	120.0	0.00
P-64	1,177.00	12	Cast iron	100.0	0.85
P-103	437.00	12	PVC	120.0	1.00
P-65	1,196.00	10	Cast iron	100.0	0.70
P-66	650.00	12	PVC	120.0	1.78
P-69	601.00	12	PVC	120.0	0.70
P-67	439.00	12	PVC	120.0	1.00
P-70	589.00	12	Cast iron	100.0	1.00
P-112	302.00	12	Cast iron	100.0	1.78
P-72	593.00	10	PVC	120.0	0.70
P-76	1,144.00	12	PVC	120.0	0.70
P-77	1,202.00	12	Cast iron	100.0	2.40
P-79	1,358.00	10	PVC	120.0	3.23
P-80	653.00	12	Cast iron	100.0	2.18
P-83	983.00	12	Transite	100.0	0.70
P-81	465.00	20	Cast iron	100.0	1.70
P-84	917.00	16	PVC	120.0	1.00
P-124	351.00	14	Cast iron	100.0	2.40
P-87	1,281.00	12	Cast iron	100.0	0.35
P-99	645.00	16	PVC	120.0	1.78
P-88	567.00	20	PVC	120.0	0.35
P-89	240.00	16	PVC	120.0	0.35
P-90	914.00	20	Cast iron	100.0	0.50
P-97	679.00	16	PVC	120.0	1.63
P-93	372.00	20	Cast iron	100.0	0.50
P-132	394.00	16	PVC	120.0	0.50
P-94	475.00	20	PVC	120.0	0.80
P-127	374.00	20	PVC	120.0	2.08
P-96	748.00	12	PVC	120.0	1.15
P-100	460.00	16	PVC	120.0	1.78
P-98	498.00	16	PVC	120.0	0.85
P-121	1,183.00	8	Cast iron	100.0	2.08
P-122	881.00	12	Cast iron	100.0	4.96
P-123	395.00	10	Cast iron	100.0	1.30
P-110	471.00	12	PVC	120.0	1.30
P-113	542.00	12	Cast iron	100.0	1.78
P-116	598.00	14	Cast iron	100.0	1.78
P-120	179.00	12	Cast iron	100.0	1.83
P-125	394.00	14	Cast iron	100.0	2.40
P-126	1,159.00	14	Cast iron	100.0	1.00
P-128	738.00	20	PVC	120.0	2.08
P-129	367.00	12	PVC	120.0	2.56
P-130	512.00	10	PVC	120.0	3.68
P-131	360.00	10	PVC	120.0	2.88
P-135	438.00	10	PVC	120.0	2.88
P-136	648.00	12	PVC	120.0	3.36
P-137	1,042.00	10	PVC	120.0	3.68

Flow Analysis for Building B1



Scenario: Base
Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Total Upper Limit Flow (gpm)
J-1	100.00	Demand	126.95	Fixed	126.95	262.31	70.19	4,627.95
J-2	125.00	Demand	44.73	Fixed	44.73	262.29	59.37	4,545.73
J-3	125.00	Demand	44.76	Fixed	44.76	262.24	59.35	4,545.76
J-4	110.00	Demand	44.76	Fixed	44.76	262.22	65.83	4,545.76
J-5	110.00	Demand	44.73	Fixed	44.73	262.22	65.83	4,545.73
J-6	112.50	Demand	62.55	Fixed	62.55	262.34	64.79	4,563.55
J-7	111.00	Demand	29.44	Fixed	29.44	261.02	64.87	4,530.44
J-8	112.50	Demand	29.44	Fixed	29.44	257.14	62.55	4,530.44
J-9	112.50	Demand	62.55	Fixed	62.55	262.59	64.90	4,563.55
J-10	125.00	Demand	62.55	Fixed	62.55	273.69	64.30	4,563.55
J-11	120.00	Demand	72.86	Fixed	72.86	270.56	65.11	4,573.86
J-12	100.00	Demand	40.35	Fixed	40.35	259.71	69.07	4,541.35
J-13	112.00	Demand	29.44	Fixed	29.44	251.57	60.36	4,530.44
J-14	112.00	Demand	29.44	Fixed	29.44	257.18	62.78	4,530.44
J-15	112.00	Demand	69.96	Fixed	69.96	251.60	60.37	4,570.96
J-16	115.00	Demand	38.89	Fixed	38.89	241.35	54.64	4,539.89
J-17	125.00	Demand	76.07	Fixed	76.07	241.76	50.49	4,577.07
J-20	120.00	Demand	7.32	Fixed	7.31	237.46	50.79	4,508.31
J-21	185.00	Demand	33.12	Fixed	33.12	285.10	43.29	4,534.12
J-22	140.00	Demand	134.91	Fixed	134.90	271.77	56.98	4,635.91
J-23	125.00	Demand	94.51	Fixed	94.51	263.42	59.86	4,595.51
J-24	135.00	Demand	20.49	Fixed	20.49	252.73	50.91	4,521.49
J-25	120.00	Demand	122.89	Fixed	122.89	252.65	57.36	4,623.89
J-26	130.00	Demand	30.17	Fixed	30.17	250.17	51.97	4,531.17
J-27	120.00	Demand	35.57	Fixed	35.57	244.46	53.82	4,536.57
J-28	130.00	Demand	13.21	Fixed	13.21	239.86	47.51	4,514.21
J-29	125.00	Demand	17.11	Fixed	17.11	240.07	49.76	4,518.11
J-30	112.00	Demand	9.26	Fixed	9.26	235.44	53.38	4,510.26
J-31	120.00	Demand	18.89	Fixed	18.89	237.18	50.67	4,519.89
J-32	100.00	Demand	24.39	Fixed	24.39	236.12	58.86	4,525.39
J-33	120.00	Demand	35.37	Fixed	35.37	235.61	50.00	4,536.37
J-34	125.00	Demand	0.00	Fixed	0.00	235.65	47.85	4,501.00
J-35	120.00	Demand	20.33	Fixed	20.33	233.68	49.16	4,521.33
J-36	125.00	Demand	53.18	Fixed	53.18	233.68	47.00	4,554.18
J-37	100.00	Demand	33.92	Fixed	33.92	234.04	57.96	4,534.92
J-38	120.00	Demand	39.26	Fixed	39.26	234.66	49.58	4,540.26
J-39	112.00	Demand	14.90	Fixed	14.90	230.16	51.09	4,515.90
J-40	115.00	Demand	74.37	Fixed	74.37	224.22	47.23	4,575.37
J-41	117.00	Demand	46.82	Fixed	46.82	224.23	46.37	4,547.82
J-42	117.00	Demand	27.42	Fixed	27.42	224.23	46.37	4,528.42
J-43	112.00	Demand	15.11	Fixed	15.11	221.56	47.38	4,516.11
J-44	120.00	Demand	19.39	Fixed	19.39	219.41	42.99	4,520.39
J-45	120.00	Demand	30.66	Fixed	30.66	219.66	43.10	4,531.66
J-47	112.00	Demand	21.87	Fixed	21.87	219.30	46.40	4,522.87
J-48	110.00	Demand	24.58	Fixed	24.58	210.66	43.53	4,525.58
J-49	110.00	Demand	38.74	Fixed	38.74	210.65	43.52	4,539.74
J-50	110.00	Demand	41.91	Fixed	41.91	210.32	43.38	4,542.91
J-51	112.00	Demand	47.35	Fixed	47.35	214.21	44.20	4,548.35
J-52	110.00	Demand	25.97	Fixed	25.97	201.07	39.38	4,526.97
J-53	110.00	Demand	59.63	Fixed	59.63	203.31	40.35	4,560.63

Scenario: Base
Steady State Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Total Upper Limit Flow (gpm)
J-55	100.00	Demand	39.82	Fixed	39.82	200.71	43.55	4,540.82
J-56	110.00	Demand	47.94	Fixed	47.94	202.90	40.17	4,548.94
J-57	110.00	Demand	60.84	Fixed	60.84	201.08	39.39	4,561.84
J-58	110.00	Demand	44.90	Fixed	44.90	202.02	39.79	4,545.90
J-60	110.00	Demand	37.49	Fixed	37.49	201.96	39.77	4,538.49
J-61	110.00	Demand	26.00	Fixed	26.00	201.91	39.74	4,527.00
J-62	110.00	Demand	62.67	Fixed	62.67	201.78	39.69	4,563.67
J-64	110.00	Demand	40.58	Fixed	40.58	202.32	39.92	4,541.58
J-63	110.00	Demand	54.76	Fixed	54.76	201.61	39.61	4,555.76
J-66	125.00	Demand	32.70	Fixed	32.70	241.67	50.45	4,533.70
J-69	112.00	Demand	0.00	Fixed	0.00	236.59	53.88	4,501.00
J-70	116.00	Demand	0.00	Fixed	0.00	221.52	45.63	4,501.00
J-72	116.00	Demand	0.00	Fixed	0.00	218.77	44.44	4,501.00
J-73	112.00	Demand	29.44	Fixed	29.44	251.60	60.37	4,530.44
J-74	110.00	Demand	0.00	Fixed	0.00	213.82	44.90	4,501.00
J-75	110.00	Demand	0.00	Fixed	0.00	201.86	39.72	4,501.00
J-78	110.00	Demand	0.00	Fixed	0.00	202.02	39.79	4,501.00
J-81	110.00	Demand	1,500.00	Fixed	1,500.00	186.65	33.15	6,001.00
J-82	110.00	Demand	1,500.00	Fixed	1,500.00	181.81	31.05	6,001.00
J-83	110.00	Demand	1,500.00	Fixed	1,500.00	192.60	35.72	6,001.00

Scenario: Base
Steady State Analysis
MARE ISLAND TANK REPORT

Node Label	Base Elevation (ft)	Minimum Level (ft)	Initial Level (ft)	Maximum Level (ft)	Inactive Volume (ft^3)	Tank Diameter (ft)	Tank Inflow (gpm)	Current Status	Calculated Hydraulic Grade (ft)	Tank Level (ft)
T-1	285.00	6.20	12.20	31.20	802,000.00	200.00	-7,119.22	Draining	297.20	12.20

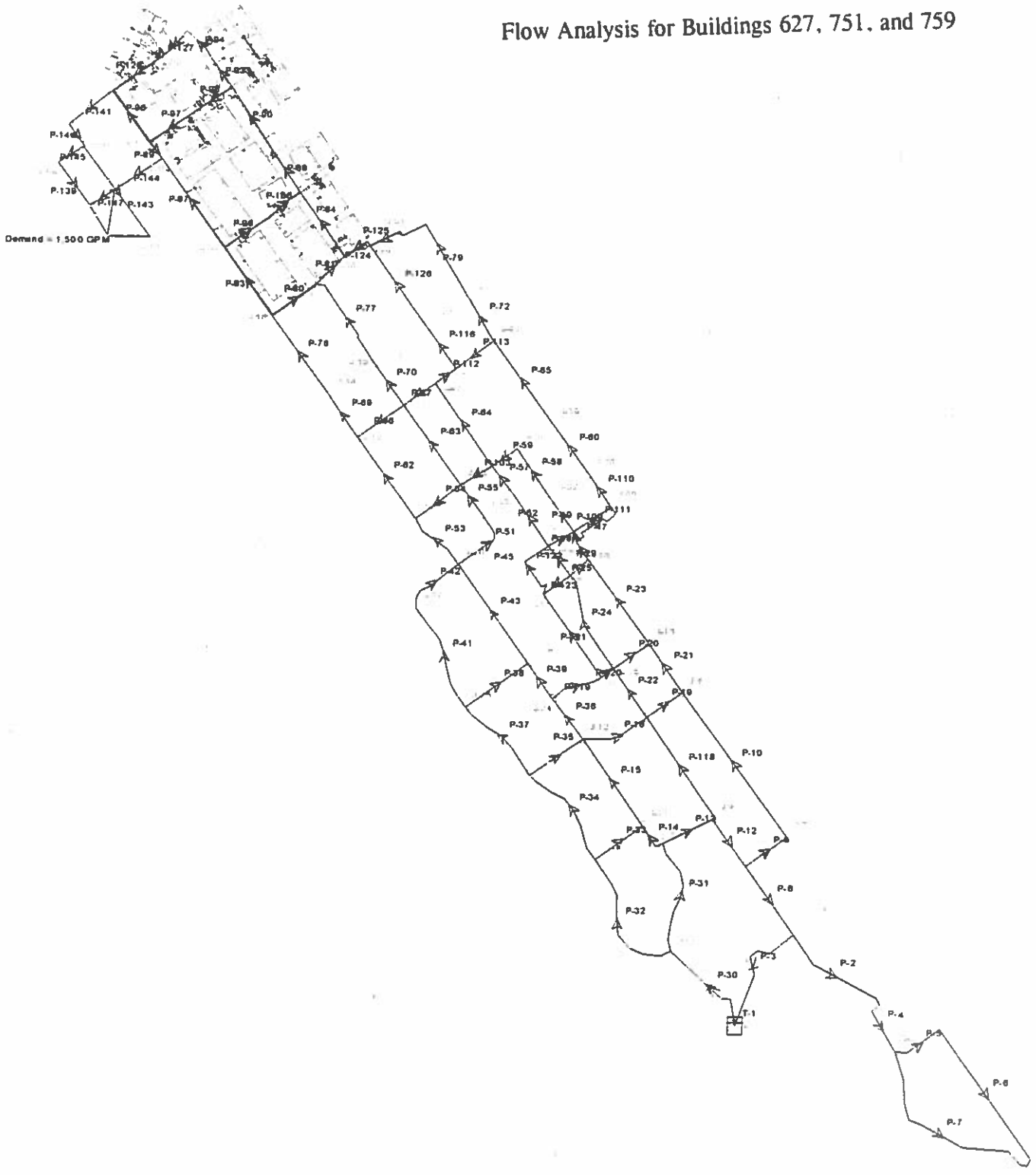
Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-2	1,344.00	20	PVC	120.0	0.55
P-8	983.00	20	PVC	120.0	2.56
P-3	1,465.00	20	PVC	120.0	1.68
P-4	668.00	12	PVC	120.0	2.43
P-30	1,248.00	20	PVC	120.0	0.63
P-5	616.00	10	PVC	120.0	2.08
P-6	1,853.00	10	PVC	120.0	1.60
P-7	2,481.00	12	PVC	120.0	1.20
P-9	583.00	12	PVC	120.0	2.08
P-12	675.00	20	PVC	120.0	1.15
P-10	2,106.00	12	PVC	120.0	0.00
P-13	652.00	12	Ductile Iro	100.0	0.00
P-118	1,469.00	12	Cast iron	100.0	2.60
P-14	387.00	12	Cast iron	100.0	1.50
P-15	1,235.00	12	Cast iron	100.0	0.70
P-18	818.00	12	PVC	120.0	2.66
P-36	597.00	12	Cast iron	100.0	0.85
P-20	502.00	10	Cast iron	100.0	2.56
P-21	691.00	10	Ductile Iro	100.0	0.70
P-23	1,219.00	10	Cast iron	100.0	0.70
P-19	513.00	12	PVC	120.0	1.63
P-22	700.00	12	PVC	120.0	0.00
P-24	1,240.00	12	PVC	120.0	1.20
P-29	258.00	10	Cast iron	100.0	0.70
P-25	263.00	10	Cast iron	100.0	1.78
P-45	428.00	12	PVC	120.0	0.85
P-47	111.00	12	PVC	120.0	0.00
P-111	750.00	10	Cast iron	100.0	5.96
P-31	1,356.00	16	PVC	120.0	2.13
P-32	1,668.00	16	PVC	120.0	1.63
P-33	679.00	8	Cast iron	100.0	2.56
P-34	1,300.00	16	PVC	120.0	0.70
P-35	754.00	12	PVC	120.0	2.56
P-37	1,113.00	12	PVC	120.0	0.70
P-39	507.00	12	Cast iron	100.0	0.70
P-119	641.00	12	Cast iron	100.0	1.83
P-38	890.00	8	Cast iron	100.0	2.56
P-41	1,317.00	12	PVC	120.0	0.70
P-43	1,424.00	12	Cast iron	100.0	1.63
P-42	753.00	12	PVC	120.0	0.85
P-51	857.00	12	Cast iron	100.0	2.58
P-53	743.00	12	PVC	120.0	0.85
P-48	333.00	8	Cast iron	100.0	0.00
P-52	756.00	12	Cast iron	100.0	0.85
P-60	722.00	10	Cast iron	100.0	0.00
P-49	461.00	12	PVC	120.0	1.00
P-109	527.00	12	PVC	120.0	1.30
P-58	727.00	12	PVC	120.0	0.00
P-57	400.00	12	PVC	120.0	0.00
P-54	661.00	8	Cast iron	130.0	2.56
P-62	1,174.00	12	PVC	120.0	0.70
P-55	432.00	12	Cast iron	100.0	0.70

Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-63	1,152.00	12	Cast iron	100.0	0.85
P-59	342.00	12	PVC	120.0	0.00
P-64	1,177.00	12	Cast iron	100.0	0.85
P-103	437.00	12	PVC	120.0	1.00
P-65	1,196.00	10	Cast iron	100.0	0.70
P-66	650.00	12	PVC	120.0	1.78
P-69	601.00	12	PVC	120.0	0.70
P-67	439.00	12	PVC	120.0	1.00
P-70	589.00	12	Cast iron	100.0	1.00
P-112	302.00	12	Cast iron	100.0	1.78
P-72	593.00	10	PVC	120.0	0.70
P-76	1,144.00	12	PVC	120.0	0.70
P-77	1,202.00	12	Cast iron	100.0	2.40
P-79	1,358.00	10	PVC	120.0	3.23
P-80	653.00	12	Cast iron	100.0	2.18
P-83	983.00	12	Transite	100.0	0.70
P-81	465.00	20	Cast iron	100.0	1.70
P-84	917.00	16	PVC	120.0	1.00
P-124	351.00	14	Cast iron	100.0	2.40
P-99	645.00	16	PVC	120.0	1.78
P-140	225.00	12	Cast iron	100.0	0.70
P-88	567.00	20	PVC	120.0	0.35
P-89	240.00	16	PVC	120.0	0.35
P-90	914.00	20	Cast iron	100.0	0.50
P-97	679.00	16	PVC	120.0	1.63
P-93	372.00	20	Cast iron	100.0	0.50
P-132	394.00	16	PVC	120.0	0.50
P-94	475.00	20	PVC	120.0	0.80
P-127	374.00	20	PVC	120.0	2.08
P-96	748.00	12	PVC	120.0	1.15
P-100	460.00	16	PVC	120.0	1.78
P-98	498.00	16	PVC	120.0	0.85
P-121	1,183.00	8	Cast iron	100.0	2.08
P-122	881.00	12	Cast iron	100.0	4.96
P-123	395.00	10	Cast iron	100.0	1.30
P-110	471.00	12	PVC	120.0	1.30
P-113	542.00	12	Cast iron	100.0	1.78
P-116	598.00	14	Cast iron	100.0	1.78
P-120	179.00	12	Cast iron	100.0	1.83
P-125	394.00	14	Cast iron	100.0	2.40
P-126	1,159.00	14	Cast iron	100.0	1.00
P-128	738.00	20	PVC	120.0	2.08
P-138	888.00	10	PVC	120.0	2.08
P-142	136.00	12	PVC	120.0	2.56
P-139	1,270.00	10	PVC	120.0	3.68
P-141	1,056.00	12	Cast iron	100.0	0.35

Flow Analysis for Buildings 627, 751, and 759



Scenario: Base
Steady State Analysis
MARE ISLAND TANK REPORT

Node Label	Base Elevation (ft)	Minimum Level (ft)	Initial Level (ft)	Maximum Level (ft)	Inactive Volume (ft^3)	Tank Diameter (ft)	Tank Inflow (gpm)	Current Status	Calculated Hydraulic Grade (ft)	Tank Level (ft)
T-1	285.00	6.20	12.20	31.20	802,000.00	200.00	-7,119.22	Draining	297.20	12.20

Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-2	1,344.00	20	PVC	120.0	0.55
P-8	983.00	20	PVC	120.0	2.56
P-3	1,465.00	20	PVC	120.0	1.68
P-4	668.00	12	PVC	120.0	2.43
P-30	1,248.00	20	PVC	120.0	0.63
P-5	616.00	10	PVC	120.0	2.08
P-6	1,853.00	10	PVC	120.0	1.60
P-7	2,481.00	12	PVC	120.0	1.20
P-9	583.00	12	PVC	120.0	2.08
P-12	675.00	20	PVC	120.0	1.15
P-10	2,106.00	12	PVC	120.0	0.00
P-13	652.00	12	Ductile Irc	100.0	0.00
P-118	1,469.00	12	Cast iron	100.0	2.60
P-14	387.00	12	Cast iron	100.0	1.50
P-15	1,235.00	12	Cast iron	100.0	0.70
P-18	818.00	12	PVC	120.0	2.66
P-36	597.00	12	Cast iron	100.0	0.85
P-20	502.00	10	Cast iron	100.0	2.56
P-21	691.00	10	Ductile Irc	100.0	0.70
P-23	1,219.00	10	Cast iron	100.0	0.70
P-19	513.00	12	PVC	120.0	1.63
P-22	700.00	12	PVC	120.0	0.00
P-24	1,240.00	12	PVC	120.0	1.20
P-29	258.00	10	Cast iron	100.0	0.70
P-25	263.00	10	Cast iron	100.0	1.78
P-45	428.00	12	PVC	120.0	0.85
P-47	111.00	12	PVC	120.0	0.00
P-111	750.00	10	Cast iron	100.0	5.96
P-31	1,356.00	16	PVC	120.0	2.13
P-32	1,668.00	16	PVC	120.0	1.63
P-33	679.00	8	Cast iron	100.0	2.56
P-34	1,300.00	16	PVC	120.0	0.70
P-35	754.00	12	PVC	120.0	2.56
P-37	1,113.00	12	PVC	120.0	0.70
P-39	507.00	12	Cast iron	100.0	0.70
P-119	641.00	12	Cast iron	100.0	1.83
P-38	890.00	8	Cast iron	100.0	2.56
P-41	1,317.00	12	PVC	120.0	0.70
P-43	1,424.00	12	Cast iron	100.0	1.63
P-42	753.00	12	PVC	120.0	0.85
P-51	857.00	12	Cast iron	100.0	2.58
P-53	743.00	12	PVC	120.0	0.85
P-48	333.00	8	Cast iron	100.0	0.00
P-52	756.00	12	Cast iron	100.0	0.85
P-60	722.00	10	Cast iron	100.0	0.00
P-49	461.00	12	PVC	120.0	1.00
P-109	527.00	12	PVC	120.0	1.30
P-58	727.00	12	PVC	120.0	0.00
P-57	400.00	12	PVC	120.0	0.00
P-54	661.00	8	Cast iron	130.0	2.56
P-62	1,174.00	12	PVC	120.0	0.70
P-55	432.00	12	Cast iron	100.0	0.70

Scenario: Base
Steady State Analysis
PIPE DATA MARE ISLAND

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss
P-63	1,152.00	12	Cast iron	100.0	0.85
P-59	342.00	12	PVC	120.0	0.00
P-64	1,177.00	12	Cast iron	100.0	0.85
P-103	437.00	12	PVC	120.0	1.00
P-65	1,196.00	10	Cast iron	100.0	0.70
P-66	650.00	12	PVC	120.0	1.78
P-69	601.00	12	PVC	120.0	0.70
P-67	439.00	12	PVC	120.0	1.00
P-70	589.00	12	Cast iron	100.0	1.00
P-112	302.00	12	Cast iron	100.0	1.78
P-72	593.00	10	PVC	120.0	0.70
P-76	1,144.00	12	PVC	120.0	0.70
P-77	1,202.00	12	Cast iron	100.0	2.40
P-79	1,358.00	10	PVC	120.0	3.23
P-80	653.00	12	Cast iron	100.0	2.18
P-83	983.00	12	Transite	100.0	0.70
P-81	465.00	20	Cast iron	100.0	1.70
P-84	917.00	16	PVC	120.0	1.00
P-124	351.00	14	Cast iron	100.0	2.40
P-87	1,281.00	12	Cast iron	100.0	0.35
P-99	645.00	16	PVC	120.0	1.78
P-88	567.00	20	PVC	120.0	0.35
P-89	240.00	16	PVC	120.0	0.35
P-144	655.00	12	PVC	120.0	1.78
P-90	914.00	20	Cast iron	100.0	0.50
P-97	679.00	16	PVC	120.0	1.63
P-93	372.00	20	Cast iron	100.0	0.50
P-94	475.00	20	PVC	120.0	0.80
P-127	374.00	20	PVC	120.0	2.08
P-96	748.00	12	PVC	120.0	1.15
P-100	460.00	16	PVC	120.0	1.78
P-98	498.00	16	PVC	120.0	0.85
P-121	1,183.00	8	Cast iron	100.0	2.08
P-122	881.00	12	Cast iron	100.0	4.96
P-123	395.00	10	Cast iron	100.0	1.30
P-110	471.00	12	PVC	120.0	1.30
P-113	542.00	12	Cast iron	100.0	1.78
P-116	598.00	14	Cast iron	100.0	1.78
P-120	179.00	12	Cast iron	100.0	1.83
P-125	394.00	14	Cast iron	100.0	2.40
P-126	1,159.00	14	Cast iron	100.0	1.00
P-128	738.00	20	PVC	120.0	2.08
P-139	642.00	10	PVC	120.0	1.60
P-145	358.00	10	PVC	120.0	0.00
P-141	644.00	12	PVC	120.0	1.15
P-146	339.00	12	PVC	120.0	2.08
P-143	1,332.00	12	PVC	120.0	2.03
P-147	344.00	10	PVC	120.0	2.08

NORTH ISLAND ACCESS IMPROVEMENTS
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

ASSUMPTIONS FOR DESIGN OF THE SANITARY SEWER SYSTEM

Each building has a connection extending to the most distant point of the building from the connection to the backbone.

Sewer pipes are designed to maintain a 1% slope and any runs that do not meet this criteria are clearly marked on the exhibit. The areas not meeting the minimum 1% are located in the western portion of north Mare Island where consolidation of the soils is predicted to be less than in the remaining portion of north Mare Island.

The demands are based on the attached Utility Demand Factor Table.

The peak factor is based on the equations shown on page 5-9 of the City of Vallejo, Sanitation and Flood Control District (VSFCD) Design Standards.

The model accumulates peak flows through the system. Pipeline flow capacities are computed using Manning's equation. The roughness coefficient for Manning's equation computations is based on the VSFCD requirement of "n" = 0.013 for all pipes.

Infiltration allowances were based on 600 gallons per day per acre for new developments, and 4,000 gallons per day per acre for areas sewered as of January 1970 per VSFCD standards.

07/25/01

Utility Demand Factors [1]	LAND USE CLASSIFCATIONS																			
	NON-RESIDENTIAL							RESIDENTIAL						CIVIC/RECREATION/OPEN SPACE						
	HI	LI	WH	MIX	RET	UNIV	SCH	HR	MR	SF	SF-EX	L/W	DORM	GOLF	D-PK	R-PK	OS [4]	CVC	GOV	RDS
WATER																				
AFY/SF	0.00011	0.00008	0.00006	0.00008	0.00022	0.00022	0.00022													
AFY/AC (Irrigation)		0.11202	0.05601	0.22404	0.22404	0.22404	0.22404	0.22404	0.22404	0.22404	0.22404	0.11202	0.11202					0.00022	0.00022	
AFY/DU								0.25	0.3	0.35	0.35	0.25			1.5			0.22404	0.22404	0.22404
AFY/EMP&PERS	0.05601	0.05601	0.05601	0.05601		0.05601	0.05601													
AFY/BED															0.01680	0.01680				
AFY/COURSE													0.11							
AFY/SF/CLUBHSE														315						
														0.0005						
WASTE WATER																				
% WATER/SF	85%	85%	80%	90%	85%	90%	90%							90%				90%	90%	
% WATER/EMP	85%	85%	85%	85%										80%	80%	85%				
GPD/DU								216	216	216	216	216	175							
STORM WATER																				
NEW C FACTOR [2]	0.90	0.68	0.85	0.65	0.73	0.65	0.65	0.40	0.40	0.35	0.35	0.35	0.35	0.20	0.20	0.20	0.27	0.20	0.20	0.80
EXIST C FACTOR [3]	0.95	0.95	0.95	0.95	0.95										0.27		0.27	0.27	0.27	0.95

[1] Assumes Tight Lines. At the time of design, new lines will be increased one commercial size to account for I&I (according to the City of Vallejo)

[2] "C" Factor applicable to new development or redevelopment areas to City of Vallejo Standards.

[3] "C" Factor applicable to existing conditions and reuse of existing facilities; also includes local soil conditions for open areas

[4] OS - There are a few areas where a portion of the open space will require irrigation

LAND USE CLASSIFICATIONS

NON RESIDENTIAL

HI	HEAVY INDUSTRIAL
LI	LIGHT IND/ASSMBLY-MFG
WH	WAREHOUSE/DISTRIBUTION
MIX	MIXED USE/OFFICE/R&D
RET	RETAIL/COMM
UNIV	UNIVERSITY
SCH	SCHOOLS

RESIDENTIAL

HR	HIGH DENSITY - NEW
MR	MED DENSITY - NEW
SF	SINGLE FAMILIY - NEW
SF-EX	SINGLE FAMILY - EXITING
L/W	CONDO/LIVE/WORK
DORM	DORMITORY BEDS

CIVIC/REC/OPEN SPACE/RDS

GOLF	GOLF COURSE
D-PK	DEVELOPED PARK
R-PK	REGIONAL PARK
OS	OPEN SPACE/SLC/MISC
CVC	CIVIC/REC SPACE
GOV	VA/ARMY/USFS
RDS	ROADS

MARE ISLAND NORTH RO[illegible]AY IMPROVEMENT PROJECT
SANITARY SEWER SYSTEM
PIPE SIZE CALCULATIONS AND PUMP STATION DESIGN FLOWS

PIPE	US INV	DS INV.	LENGTH (ft)	SLOPE (ft/ft)	MAT'L	NEW/ EXIST	"n"	DIAMETER (in)	Qfull (MGD)	Vfull (f/s)	90% BLDG ksf * 200gal/ksf)	INFLOW (MGD)	% CAP	PEAK INFLOW	INFILTRATION (MGD)	PEAK + INFILTRATION (MGD)	PEAK %CAP	Q/Qfull	V/Vfull (from graph)	PEAK VELOCITY (f/s)	CONTRIBUTING AREA (ac)	INFILTRATION (gpd)	TOTAL INFLOW (MGD)
DOM 2 PUMP STATION																							
S-1	5 35	1 85	350	0 010	HDPE	N	0 013	6	0 384	2 865	14868 0	0 015	4%	0 0404	0 0033	0 0437	12 0%	0 120	0 540	1 547	5 51	3304	0 0437
S-2	1 85	-1 15	290	0 010	HDPE	N	0 013	6	0 370	2 914	14868 0	0 030	8%	0 0808	0 0066	0 0874	23 6%	0 238	0 670	1 953	5 51	3304	0 0874
S-4	4 50	1 60	340	0 0085	HDPE	N	0 013	6	0 336	2 648	13500 0	0 014	4%	0 0367	0 0029	0 0396	11 8%	0 118	0 530	1 403	4 84	2904	0 0396
S-3	1 60	-1 15	270	0 0102	HDPE	N	0 013	6	0 367	2 892	13500 0	0 027	7%	0 0734	0 0058	0 0792	21 6%	0 216	0 660	1 909	4 84	2904	0 0792
S-5	2 30	-1 15	450	0 0077	HDPE	N	0 013	8	0 688	3 039	7956 0	0 008	1%	0 0216	0 0024	0 0240	3 5%	0 035	0 320	0 973	4 0	2400	0 0240
S-6	-1 15	-3 03	280	0 007	HDPE	N	0 013	8	0 641	2 841	0 0	0 065	10%	0 1759	0 0148	0 1907	29 7%	0 297	0 720	2 046	0	0	0 1907
S-7	-3 03	-4 81	270	0 007	HDPE	N	0 013	8	0 637	2 822	0 0	0 065	10%	0 1759	0 0148	0 1907	30 0%	0 300	0 720	2 032	0	0	0 1907
S-10	2 60	0 20	240	0 010	HDPE	N	0 013	6	0 384	2 865	10755 0	0 011	3%	0 0292	0 0017	0 0309	8 5%	0 085	0 480	1 375	2 75	1652	0 0309
S-11	0 20	-2 80	260	0 012	HDPE	N	0 013	6	0 391	3 078	10755 0	0 022	6%	0 0585	0 0033	0 0818	15 8%	0 158	0 600	1 847	2 75	1652	0 0818
S-12	-2 80	-4 81	220	0 009	HDPE	N	0 013	6	0 348	2 739	3976 0	0 025	7%	0 0693	0 0057	0 0750	21 6%	0 216	0 660	1 808	4 00	2400	0 0750
S-15	1 99	0 34	165	0 010	HDPE	N	0 013	6	0 384	2 865	9162 0	0 009	3%	0 0249	0 0015	0 0264	7 2%	0 072	0 440	1 261	2 42	1452	0 0264
S-14	0 34	-2 91	330	0 010	HDPE	N	0 013	6	0 361	2 844	9162 0	0 018	5%	0 0498	0 0029	0 0527	14 6%	0 146	0 580	1 649	2 42	1452	0 0527
S-13	-2 91	-4 81	180	0 011	HDPE	N	0 013	6	0 374	2 944	7956 0	0 026	7%	0 0714	0 0053	0 0767	20 5%	0 205	0 650	1 914	4 00	2400	0 0767
S-8	-4 81	-5 91	110	0 010	HDPE	N	0 013	8	0 783	3 471	0 0	0 116	15%	0 1728	0 0258	0 1988	25 4%	0 254	0 690	2 395	0	0	0 1986
S-16	5 00	0 63	480	0 009	HDPE	N	0 013	6	0 347	2 734	15750 0	0 016	5%	0 0428	0 0030	0 0459	13 2%	0 132	0 550	1 504	5 07	3042	0 0459
S-17	0 63	-2 38	330	0 009	HDPE	N	0 013	6	0 347	2 737	15750 0	0 032	9%	0 0856	0 0061	0 0917	26 4%	0 264	0 700	1 916	5 07	3042	0 0917
S-18	3 10	-2 38	350	0 016	HDPE	N	0 013	6	0 455	3 585	30132 0	0 030	7%	0 0819	0 0043	0 0862	18 9%	0 189	0 610	2 187	7 136667	4282	0 0862
S-9	-2 38	-5 91	330	0 011	HDPE	N	0 013	8	0 810	3 590	0 0	0 062	8%	0 1675	0 0146	0 1822	22 5%	0 225	0 680	2 441	7 136667	4282	0 1822
S-19	-5 91	-6 81	90	0 010	HDPE	N	0 013	8	0 783	3 471	0 0	0 178	23%	0 2609	0 0405	0 3014	38 5%	0 385	0 790	2 742	0	0	0 3014
S-20	-6 81	-7 61	80	0 010	HDPE	N	0 013	8	0 783	3 471	0 0	0 178	23%	0 2609	0 0405	0 3014	38 5%	0 385	0 790	2 742	0	0	0 3014
																						FLOW FROM DOM 2 DRAINAGE AREA (GPM):	**209**
																						FLOW FROM NEW RAILROAD AVENUE PUMP STATION:	**320**
																						TOTAL FLOW TO DOM 2:	**529**
CEDAR AVENUE PUMP STATION																							
LNS-1	11 00	8 00	300	0 010	HDPE	E	0 013	10	1 420	4 028	77328 0	0 077	5%	0 2102	0 0253	0 2355	16 8%	0 166	0 730	2 940	42 13	25278	0 235477
																						FLOW TO NEW CEDAR AVENUE PUMP STATION (GPM):	**164**
NEW RAILROAD AVENUE PUMP STATION																							
S-26	2 40	-0 60	310	0 010	HDPE	N	0 013	6	0 358	2 819	10800 0	0 011	3%	0 0294	0 0023	0 0317	8 9%	0 089	0 480	1 353	3 8525	2311 5	0 0317
S-27	-0 60	-2 50	190	0 010	HDPE	N	0 013	6	0 384	2 865	10800 0	0 022	6%	0 0587	0 0046	0 0633	17 4%	0 174	0 600	1 719	3 8525	2311 5	0 0633
S-28	-2 50	-4 40	200	0 010	HDPE	N	0 013	8	0 763	3 383	0 0	0 099	13%	0 2689	0 0046	0 2735	35 8%	0 358	0 790	2 673	0	0	0 2735
S-50	-1 90	-4 40	260	0 010	HDPE	N	0 013	6	0 357	2 810	12528 0	0 013	4%	0 0341	0 0023	0 0364	10 2%	0 102	0 520	1 461	3 8775	2326 5	0 0364
S-29	-4 40	-7 40	290	0 010	HDPE	N	0 013	8	0 796	3 530	0 0	0 111	14%	0 1656	0 0069	0 1725	21 7%	0 217	0 680	2 401	0	0	0 1725
S-30	1 70	-0 2	190	0 010	HDPE	N	0 013	6	0 364	2 865	7884 0	0 008	2%	0 0214	0 0023	0 0237	6 5%	0 065	0 420	1 203	3 8525	2311 5	0 0237
S-31	-0 20	-7 40	250	0 029	HDPE	N	0 013	6	0 617	4 863	7884 0	0 016	3%	0 0429	0 0046	0 0475	7 7%	0 077	0 480	2 334	3 8525	2311 5	0 0475

MARE ISLAND NORTH I[illegible]WAY IMPROVEMENT PROJECT
SANITAR[illegible]SEWER SYSTEM
PIPE SIZE CALCULATIONS AND PUMP STATION DESIGN FLOWS

PIPE	US INV.	DS INV.	LENGTH (ft)	SLOPE (ft/ft)	MAT'L	NEW/ EXIST	"n"	DIAMETER (in)	Qfull (MGD)	Vfull (f/s)	90% BLDG ksf * 200gal/ksf)	INFLOW (MGD)	% CAP	PEAK INFLOW	INFILTRATION (MGD)	PEAK + INFILTRATION (MGD)	PEAK %CAP	Q/Q(full)	V/Vfull (from graph)	PEAK VELOCITY (f/s)	CONTRIBUTING AREA (ac)	INFILTRATION (gpd)	TOTAL INFLOW (MGD)
S-32	3 90	-7 40	250	0.045	HDPE	N	0.013	6	0.773	6.092	12528.0	0.013	2%	0 0341	0.0023	0.0364	4.7%	0.047	0 400	2.437	3 8775	2326 5	0 0364
S-33	-7 40	-9.20	170	0 011	HDPE	N	0.013	8	0.808	3.572	0.0	0 140	17%	0.2062	0.0139	0 2201	27.3%	0.273	0 700	2.500	0	0	0 2201
S-38	1 80	-2.8	460	0 010	HDPE	N	0.013	8	0.364	2.865	18576.0	0.019	5%	0.0505	0 0051	0.0556	15 3%	0 153	0 600	1 719	8 453333	5072	0 0556
S-37	-2 80	-5.20	220	0 011	HDPE	N	0.013	6	0 380	2.993	18576.0	0.037	10%	0.1010	0.0076	0 1086	28.6%	0.286	0 710	2 125	4 226667	2536	0 1086
S-36	-1 30	-5.20	390	0.010	HDPE	N	0 013	6	0.364	2.865	30132 0	0.030	8%	0.0819	0.0086	0.0905	24.9%	0.249	0 670	1.920	14 27333	8564	0 0905
S-35	-5 20	-7.2	200	0.010	HDPE	N	0.013	8	0.783	3.471	0 0	0.067	9%	0.1829	0.0162	0.1991	25.4%	0.254	0.680	2 360	0	0	0 1991
S-34	-7 20	-9 20	190	0.011	HDPE	N	0 013	8	0.803	3.561	0 0	0.067	8%	0.1829	0 0162	0.1991	24 8%	0.248	0.680	2 422	0	0	0 1991
S-24	-9 20	-9 80	40	0.015	HDPE	N	0.013	8	0.859	4 251	0.0	0.207	22%	0.3019	0.0301	0 3320	34.6%	0.346	0.780	3.316	0	0	0 3320
S-23	-9 80	-12 80	20	0 150	HDPE	N	0.013	8	3 033	13 444	0 0	0 207	7%	0 3019	0.0301	0 3320	10 9%	0 109	0 530	7 125	0	0	0 3320

FLOW TO NEW RAILROAD AVENUE PUMP STATION FROM DRAINAGE AREA (GPM): 231

FLOW FROM DOM 1 (GPM): 89

TOTAL FLOW TO NEW RAILROAD AVENUE PUMP STATION (GPM): 320

DOM 1 PUMP STATION

PIPE	US INV.	DS INV.	LENGTH (ft)	SLOPE (ft/ft)	MAT'L	NEW/ EXIST	"n"	DIAMETER (in)	Qfull (MGD)	Vfull (f/s)	90% BLDG ksf * 200gal/ksf)	INFLOW (MGD)	% CAP	PEAK INFLOW	INFILTRATION (MGD)	PEAK + INFILTRATION (MGD)	PEAK %CAP	Q/Q(full)	V/Vfull (from graph)	PEAK VELOCITY (f/s)	CONTRIBUTING AREA (ac)	INFILTRATION (gpd)	TOTAL INFLOW (MGD)
S-49	0.50	-1 20	120	0.014	HDPE	N	0.013	6	0.433	3.410	2808.0	0.003	1%	0.0076	0.0009	0.0085	2.0%	0.020	0.290	0 989	1 48	888	0 0085
S-39	-1.20	-2.20	100	0.010	HDPE	N	0.013	8	0.783	3.471	0.0	0.003	0%	0.0076	0.0009	0.0085	1.1%	0.011	0.240	0.833	0	0	0 0085
S-51	2 3	-2 20	500	0 009	HDPE	N	0 013	6	0.345	2.718	12528.0	0.013	4%	0.0341	0.0023	0.0364	10.5%	0 105	0.520	1 414	3.8775	2326 5	0 0364
S-40	-2 20	-3 40	120	0 010	HDPE	N	0 013	8	0.783	3.471	0.0	0.015	2%	0.0417	0.0032	0.0449	5 7%	0.057	0.420	1.458	0	0	0 0449
S-48	0 50	-3 40	200	0.020	HDPE	N	0.013	6	0.508	4.001	5166.0	0.005	1%	0.0140	0.0009	0.0149	2 9%	0.029	0 380	1.520	1 48	888	0 0149
S-52	1 5	-3.40	410	0.012	HDPE	N	0 013	6	0.397	3.132	12528.0	0 013	3%	0.0341	0 0023	0.0364	9.2%	0.092	0 500	1.566	3 8775	2326 5	0 0364
S-41	-3.40	-5 30	190	0.010	HDPE	N	0.013	8	0.783	3.471	0.0	0.033	4%	0.0898	0.0064	0.0962	12.3%	0.123	0.530	1 840	0	0	0 0962
S-47	0.50	-5.30	250	0.023	HDPE	N	0.013	6	0.554	4.364	2808.0	0.003	1%	0.0076	0 0009	0.0085	1.5%	0.015	0.250	1.091	1.48	888	0 0085
S-42	-5.30	-7.00	180	0.009	HDPE	N	0.013	8	0.761	3.373	0.0	0.036	5%	0.0974	0.0073	0.1047	13.8%	0.138	0.540	1.822	0	0	0 1047
S-46	0 50	-2.50	150	0.020	HDPE	N	0.013	6	0 514	4.052	5166.0	0.005	1%	0.0140	0 0009	0.0149	2.9%	0.029	0.380	1.540	1 48	888	0 0149
S-45	0 50	-2 50	140	0.021	HDPE	N	0 013	6	0.532	4.194	2808.0	0.003	1%	0.0076	0.0009	0.0085	1.6%	0.016	0.280	1.174	1 48	888	0 0085
S-43	-2 50	-7.00	170	0 026	HDPE	N	0.013	8	1 274	5.647	0 0	0.008	1%	0.0217	0.0018	0.0235	1.8%	0 018	0.285	1.610	0	0	0 0235
S-44	-7 00	-7 10	10	0.010	HDPE	N	0.013	6	0 783	3.471	0.0	0.044	8%	0.1191	0.0091	0.1282	16.4%	0.164	0.600	2 083	0	0	0 1282

TOTAL FLOW TO DOM 1 (GPM): 89

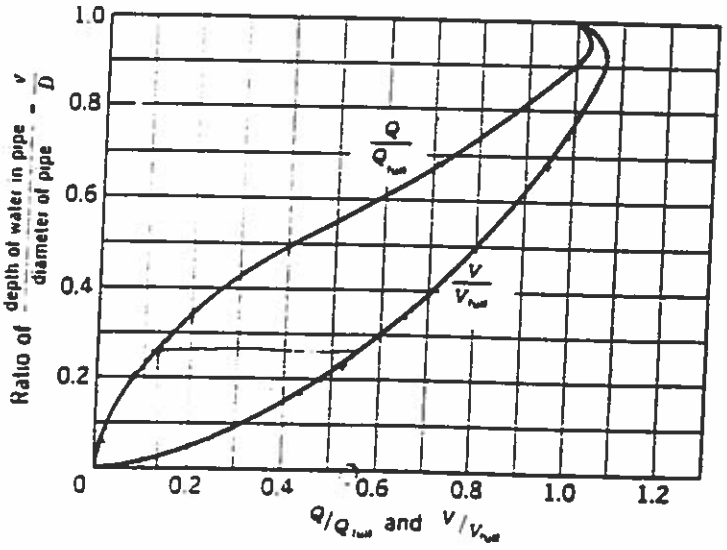


Figure 10-3 circular pipe

Size Force Main from Dam 2 to MH, Gravity flow from MH. to City of Vallejo TS

$Q = VA$

$V = 2.5\ ft/sec$ - City of Vallejo std.

$$Q = 530\ gal/min \cdot \frac{ft^3}{7.48\ gal} \cdot \frac{min}{60\ sec} = 1.18\ \frac{ft^3}{sec}$$

$$A = \frac{1.18\ ft^3/sec}{2.5\ ft/sec} = 0.47\ ft^2 \cdot \frac{144\ in^2}{ft^2} = 68\ in^2$$

circular pipe: $A = \pi r^2 = 68.0\ in^2$

$$r^2 = 21.65\ in^2$$

$$r = 4.65\ in$$

$$d = 9.3\ in \longrightarrow \underline{10"\ pipe}$$

LFR LEVINE-FRICKE

Page 1 of 4

Project N Access MI — Job # 8019.00

Subject Size FM for Dom I Pump Stn — Computed by JEC — Date 4-20-01

Checked by — Date

Size FM from Dom I Pump Station — N. MI

$Q = VA$

given $V = 2.5$ ft/sec - City of Vallejo min. design standard

$Q = 128{,}200 \frac{gal}{day}$ - Flow as estimated for Dom I

$$128{,}200 \frac{gal}{day} \cdot \frac{1\,day}{24\,hrs} \cdot \frac{hr}{60\,min} = 89 \frac{gal}{min}$$

$$89 \frac{gal}{min} \; \frac{ft^3}{7.48\,gal} \; \frac{min}{60\,sec} = 0.198 \frac{ft^3}{sec}$$

$$A = \frac{0.198 \; ft^3/sec}{2.5 \; ft/sec} = 0.08 \; ft^2$$

$$0.08\,ft^2 \cdot \frac{144\,in^2}{ft^2} = 11.42\,in^2$$

circular pipe:

$$A = \pi r^2 = 11.42\,in^2$$

$$A = r^2 = \frac{10.5\,in^2}{\pi}$$

$$r^2 = 3.64\,in^2$$

$$r = 1.91\,in$$

$$d = 3.8\,in \longrightarrow \underline{\underline{4\text{ in pipe}}}$$

Size FM from Lennar Dev. Area near Cedar Ave.

$Q = VA$

given $V = 2.5\ ft/sec$.

$$Q = 165\ gal/min \cdot \frac{1\ ft^3}{7.48\ gals} \cdot \frac{1\ min}{60\ sec} = 0.37\ ft^3/sec$$

$$A = \frac{0.37\ ft^3/sec}{2.5\ ft/sec} = 0.15\ ft^2 \cdot \frac{144\ in^2}{1\ ft^2} = 21.2\ in^2$$

$$A = \pi r^2 = 21.2\ in^2$$

$$r^2 = 6.74\ in^2$$

$$r = 2.6\ in$$

$$d = 5.2\ in \longrightarrow \underline{6"\ pipe}$$

Size Force Main from New Pump Station along Railroad Ave to Dom 2

$Q = VA$

$V = 2.5\ ft/sec$. City of Vallejo Standard

$Q = 320\ gal/min \rightarrow$ estimated flow for Dom 2

$= 0.71\ ft^3/sec$

$$A = \frac{0.71\ \frac{ft^3}{sec}}{2.5\ ft/sec} = 0.285\ ft^2 \cdot \frac{144\ in^2}{ft^2} = 41.1\ in^2$$

$A = \pi r^2 = 41.1\ in^2$

$r^2 = 13.07\ in^2$

$r = 3.62\ in$

$d = 7.23\ in \rightarrow$ 8 in pipe

NORTH ISLAND ACCESS IMPROVEMENTS
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

ASSUMPTIONS FOR DESIGN OF THE STORM DRAINAGE SYSTEM

LFR Reimer developed a model using StormCAD pressure network analysis software (Haestad Methods).

The drainage basins are less than 200 acres. The facilities were sized based on capacities calculated by the rational method.

The design level of protection is 15 years based upon the drainage area of less than 640 acres, with the storm duration based upon the time of concentration.

Rainfall intensities were calculated based upon the Rainfall Depth Duration Frequency Curves for a 15-year event, Drawing No. BB of the VSFCD standards.

The design tide elevation at the discharge points into Mare Island Strait is 3.5 feet above mean sea level.

The highest hydraulic grade line elevation was designed to be at the rim of manholes and inlets, contrary to the VSFCD standard that the energy grade line be at least 2 feet below al manhole covers, grating, and inlets. This criterion was discussed with the VSFCD; because of the special conditions at Mare Island, this will be allowed.

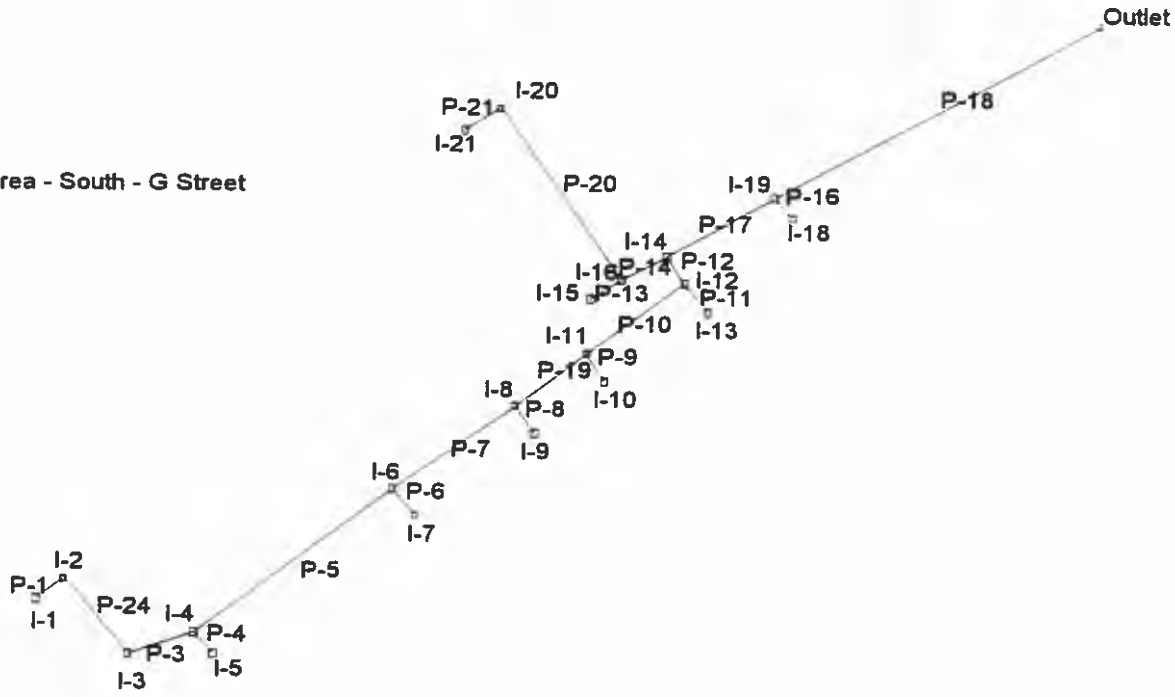
The minimum velocity in any storm drain is 2.5 feet per second according to VSFCD standards. This criterion could not be met in all cases because of the flatness of Mare Island. The velocities are shown in the storm drain calculations.

The storm drains must maintain a slope of 0.005.

The C value used in calculating the drainage is 0.80.

Exhibit 4 shows the drainage basin areas assumed in the analysis.

Legacy Development Area - South - G Street

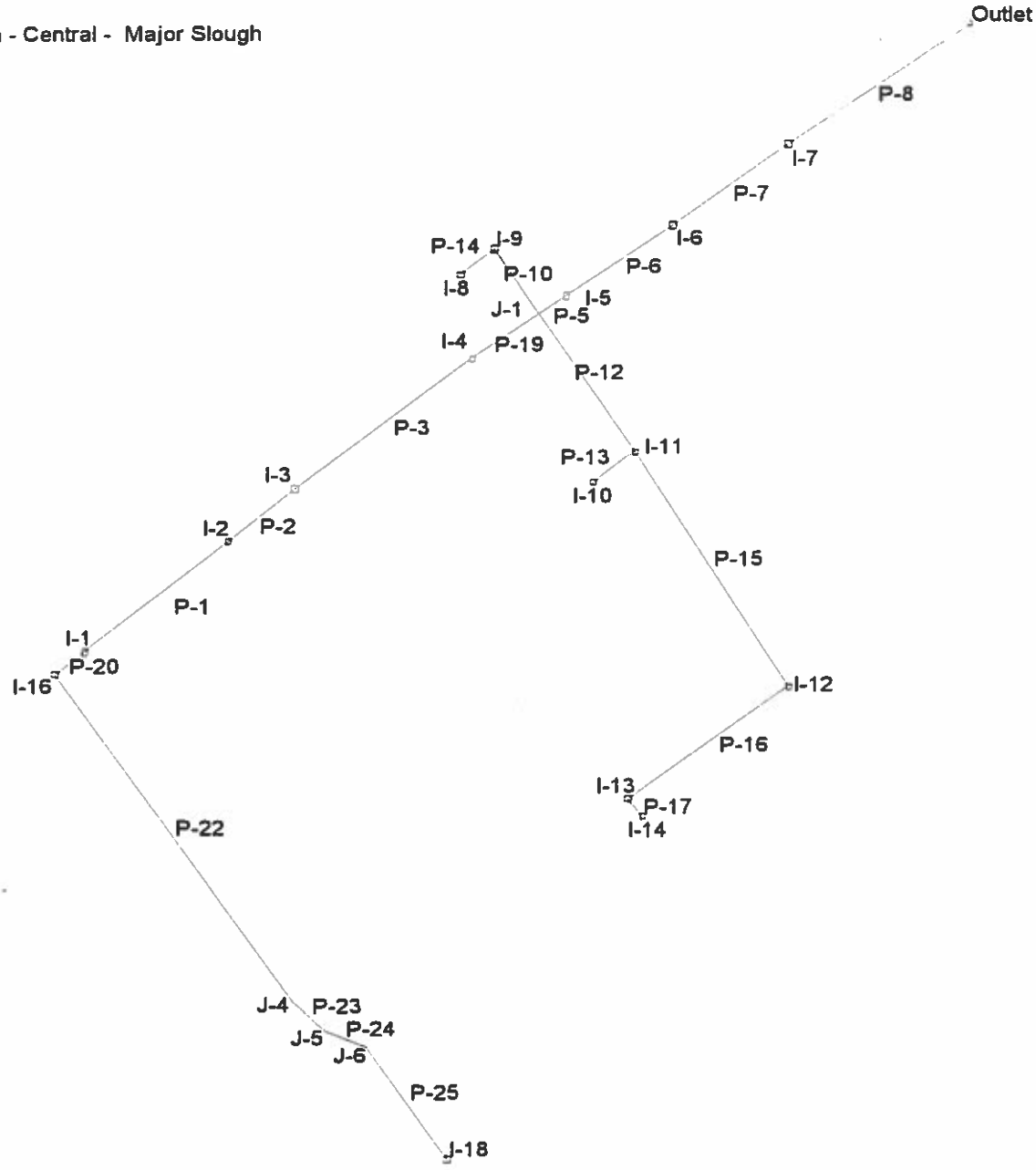


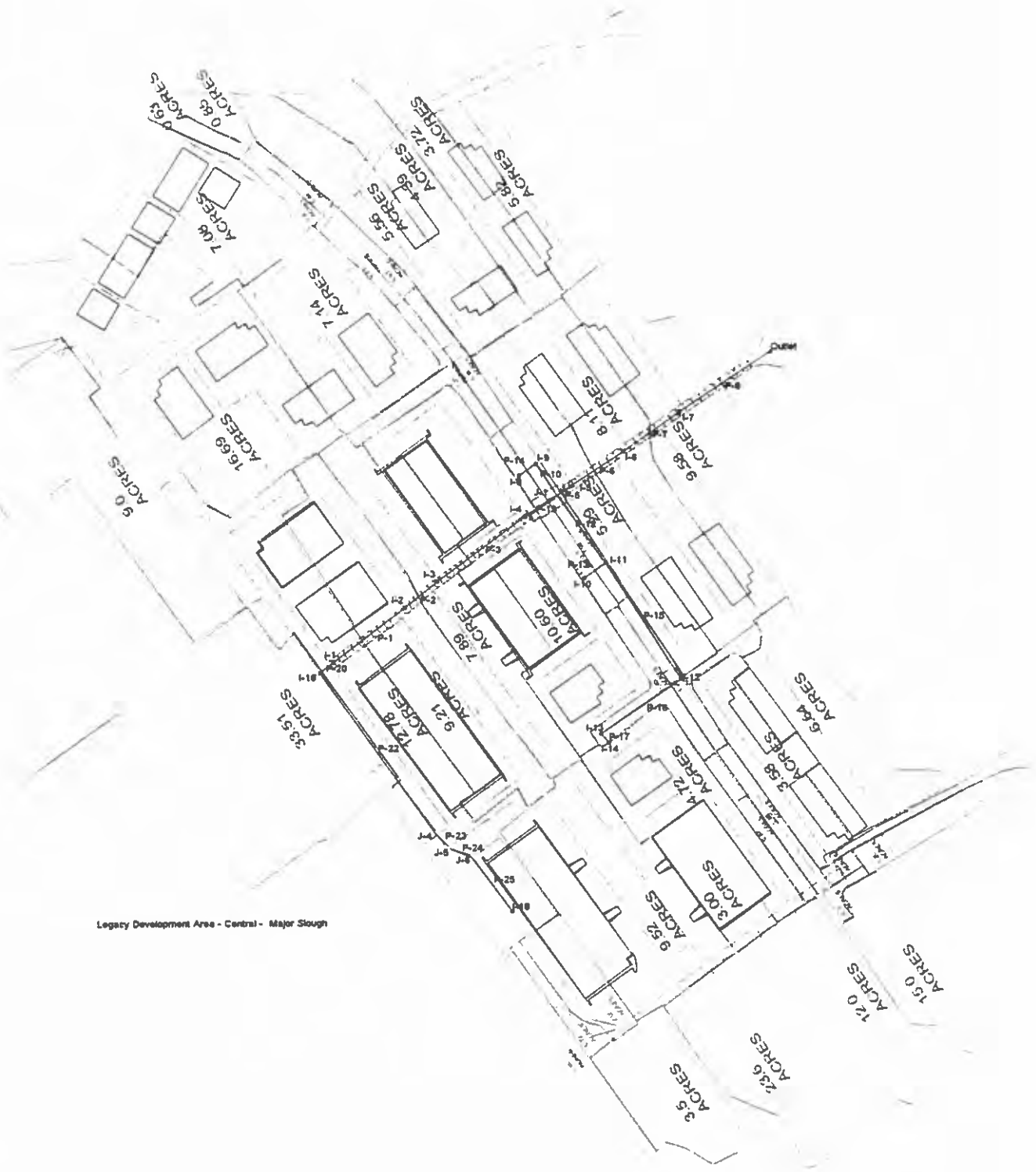

Outlet
Legacy Development Area - South - Q Street

Mare Island Repo[illegible] - Legacy Area

Pipe	Description	Up Node	Dn Node	Length (ft)	Inlet A (acres)	C	Inlet CA (acres)	Tot CA (acres)	TC (min)	Sys Flow Time (min)	Shape	Size	Sectio Material	Roughness	S (ft/ft)	Cap (cfs)	Q (cfs)	V avg (ft/s)	Up Invert (ft)	Dn Invert (ft)	Up HGL (ft)	Up Rim (ft)
P-21		I-21	I-20	73.00	0.87	0.80	0.70	0.70	10.00	10.00	Circular	12 inch	Concrete	0.013	0.006849	2.95	0.23	0.29	3.20	2.70	5.29	8.50
P-20		I-20	I-16	368.00	0.86	0.80	0.69	1.38	10.00	14.13	Circular	12 inch	Concrete	0.013	0.005978	2.75	0.55	0.70	2.70	0.50	5.28	8.50
P-13		I-15	I-16	63.00	0.49	0.80	0.39	0.39	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005159	2.56	0.13	0.17	0.83	0.50	5.20	10.00
P-14		I-16	I-14	88.00	0.49	0.80	0.39	2.17	10.00	22.94	Circular	12 inch	Concrete	0.013	0.005682	2.69	1.11	1.42	0.50	0.00	5.18	10.00
P-11		I-13	I-12	65.00	0.30	0.80	0.24	0.24	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005385	2.61	0.08	0.10	0.65	0.30	5.34	11.00
P-8		I-9	I-8	59.00	0.00	0.00	0.00	0.00	10.00	10.00	Circular	12 inch	Concrete	0.013	0.007627	3.11	0.00	0.00	2.45	2.00	6.32	12.00
P-6		I-7	I-6	62.00	23.60	0.80	18.88	18.88	16.00	16.00	Circular	12 inch	Concrete	0.013	0.006452	2.86	7.99	10.18	3.90	3.50	11.33	12.00
P-4		I-5	I-4	50.00	3.50	0.80	2.80	2.80	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005000	2.52	0.93	1.19	5.75	5.50	9.23	12.50
P-1		I-1	I-2	61.00	0.89	0.80	0.71	0.71	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005738	2.70	0.24	0.30	7.60	7.25	9.25	12.20
P-24		I-2	I-3	171.00	0.00	0.80	0.00	0.71	10.00	13.37	Circular	12 inch	Concrete	0.013	0.005263	2.58	0.27	0.35	7.25	6.35	9.25	11.00
P-3		I-3	I-4	119.00	0.73	0.80	0.58	1.30	10.00	21.57	Circular	12 inch	Concrete	0.013	0.005462	2.63	0.65	0.82	6.35	5.70	9.23	12.00
P-5		I-4	I-6	426.00	2.05	0.80	1.64	5.74	10.00	23.97	Circular	15 inch	Concrete	0.013	0.005164	4.64	3.00	2.45	5.70	3.50	9.14	12.00
P-7		I-6	I-8	257.00	9.52	0.80	7.62	32.23	10.00	26.87	Circular	24 inch	Concrete	0.013	0.005058	16.09	17.83	5.67	3.50	2.20	7.91	12.00
P-19		I-8	I-11	154.00	3.00	0.80	2.40	34.63	10.00	27.63	Circular	30 inch	Concrete	0.013	0.005195	29.56	19.42	3.96	2.20	1.40	6.17	12.00
P-9		I-10	I-11	56.00	12.00	0.80	9.60	9.60	13.30	13.30	Circular	15 inch	Concrete	0.013	0.007143	5.46	3.67	2.99	1.80	1.40	6.01	12.00
P-10		I-11	I-12	209.00	4.72	0.80	3.78	48.01	10.00	28.28	Circular	36 inch	Concrete	0.013	0.005263	48.39	27.23	3.85	1.40	0.30	5.69	12.00
P-12		I-12	I-14	57.00	0.23	0.80	0.18	48.43	10.00	29.18	Circular	36 inch	Concrete	0.013	0.005263	48.39	27.91	3.95	0.30	0.00	5.19	12.00
P-17		I-14	I-19	215.00	3.58	0.80	2.86	53.46	10.00	29.42	Box	5 x 5 ft	Concrete	0.045	0.002372	46.65	30.94	1.24	0.00	-0.51	5.08	10.00
P-16		I-18	I-19	47.00	16.20	0.80	12.96	12.96	10.00	10.00	Circular	15 inch	Concrete	0.013	0.308723	35.89	4.31	4.21	14.00	-0.51	14.84	15.00
P-18		I-19	Outlet	640.00	7.84	0.80	6.27	72.70	10.00	32.32	Box	5 x 5 ft	Concrete	0.045	0.002328	46.22	43.69	1.75	-0.51	-2.00	4.83	5.00

Legacy Development Area - Central - Major Slough




0.63 ACRES
0.60 ACRES
7.09 ACRES
3.72 ACRES
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5.56 ACRES
5.82 ACRES
7.14 ACRES
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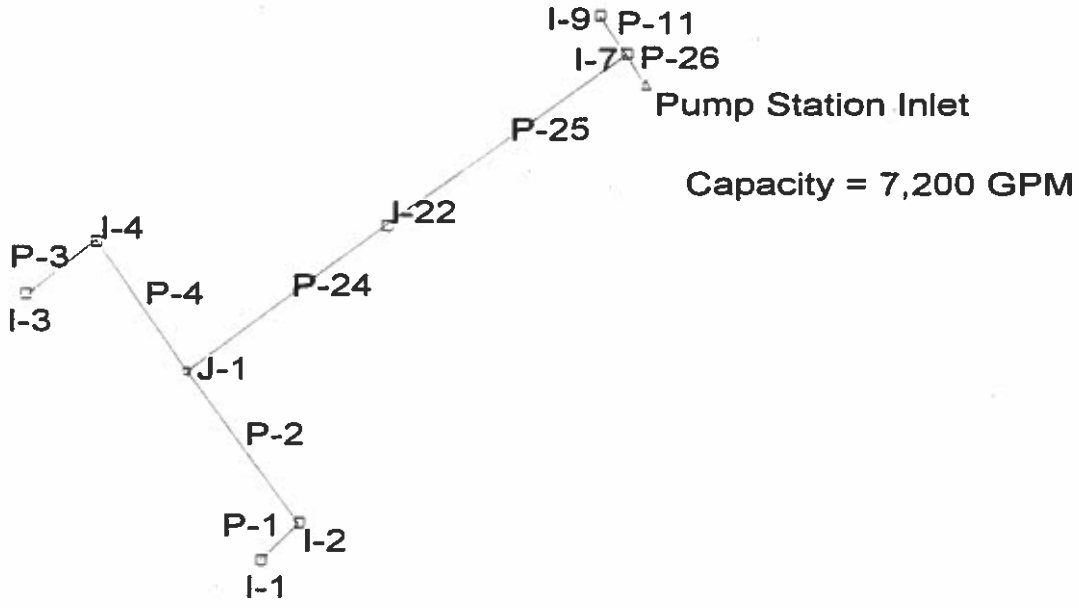
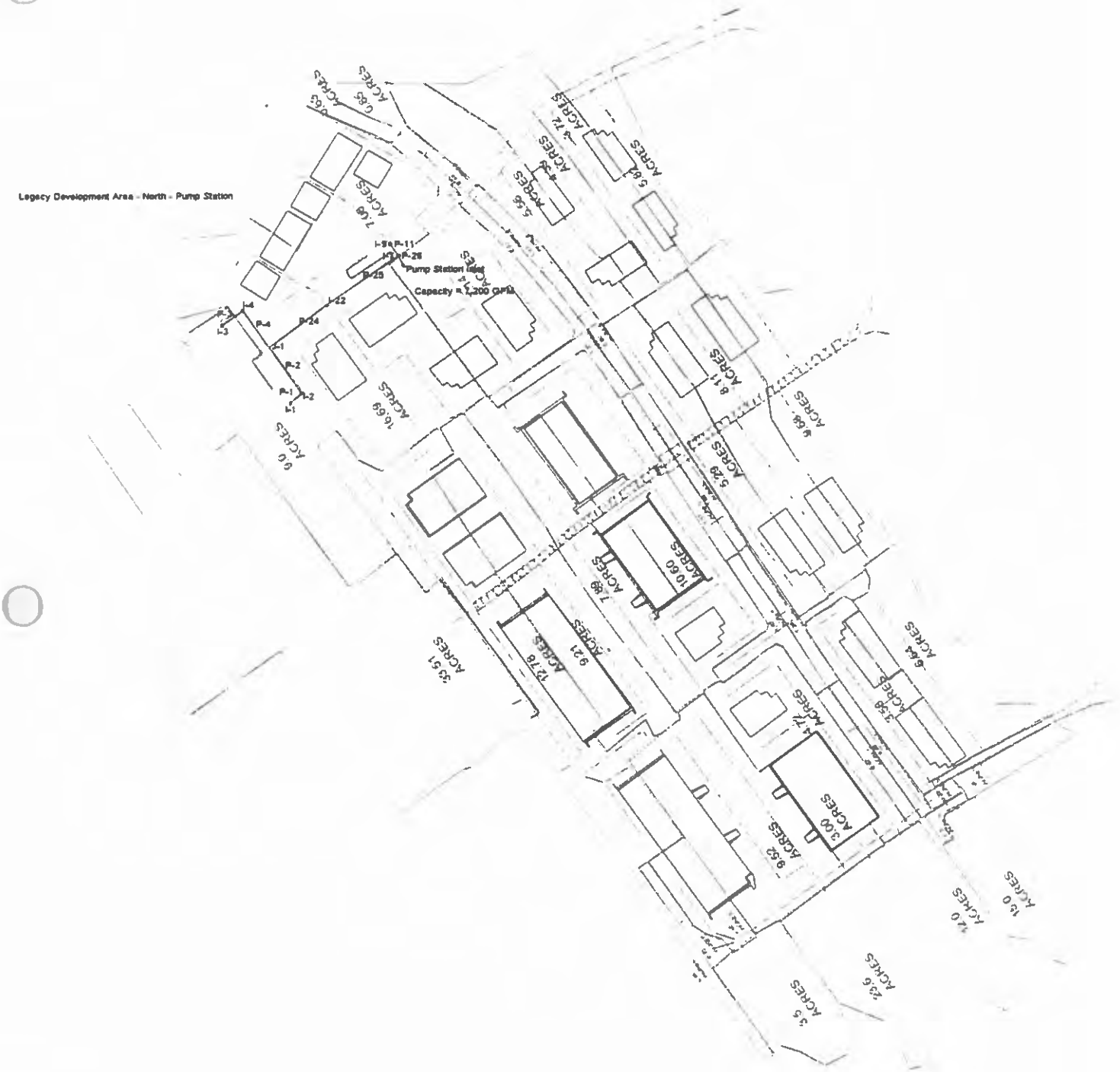
9.0 ACRES
8.11 ACRES
9.58 ACRES
5.93 ACRES
10.60 ACRES
7.89 ACRES
9.21 ACRES
19.78 ACRES
33.51 ACRES
6.64 ACRES
3.38 ACRES
4.72 ACRES
3.00 ACRES
9.52 ACRES
15.0 ACRES
12.0 ACRES
2.36 ACRES
3.5 ACRES
Outlet
Legacy Development Area - Central - Major Slough

Mare Island Rep - Legacy Area

Pipe	Description	Up Node	Dn Node	Length (ft)	Inlet A (acres)	C	Inlet CA (acres)	Tot CA (acres)	TC (min)	Sys Flow Time (min)	Shape	Size	Sectio Material	Roughness	S (ft/ft)	Cap (cfs)	Q (cfs)	V avg (ft/s)	Up Invert (ft)	Dn Invert (ft)	Up HGL (ft)	Up Rim (ft)
P-25		I-18	J-6	265.00	12.78	0.80	10.22	10.22	10.00	10.00	Circular	15 inch	Concrete	0.013	0.005283	4.70	3.40	2.77	7.10	5.70	9.28	10.60
P-24		J-6	J-5	82.00	N/A	N/A	N/A	10.22	N/A	11.59	Circular	15 inch	Concrete	0.013	0.012805	7.31	3.65	2.97	5.70	4.65	8.46	9.60
P-23		J-5	J-4	86.00	N/A	N/A	N/A	10.22	N/A	12.05	Circular	18 inch	Concrete	0.013	0.005233	7.60	3.72	2.10	4.65	4.20	8.18	8.20
P-22		J-4	I-16	768.00	N/A	N/A	N/A	10.22	N/A	12.73	Circular	18 inch	Concrete	0.013	0.005013	7.44	3.82	2.16	4.20	0.35	8.03	8.20
P-20		I-16	I-1	70.00	33.51	0.80	26.81	37.03	15.00	18.65	Circular	24 inch	Concrete	0.013	0.005000	16.00	17.16	5.46	0.35	0.00	6.74	8.00
P-1	slough	I-1	I-2	344.00	0.00	0.00	0.00	37.03	10.00	18.86	Box	6 x 5 ft	Concrete	0.045	0.001047	39.41	17.28	0.58	0.00	-0.36	6.33	8.00
P-2	slough	I-2	I-3	161.00	9.21	0.80	7.37	44.40	10.00	28.82	Box	6 x 5 ft	Concrete	0.045	0.000994	38.40	25.43	0.85	-0.36	-0.52	6.26	8.00
P-3	slough	I-3	I-4	418.00	7.89	0.80	6.31	50.71	10.00	31.98	Box	6 x 5 ft	Concrete	0.045	0.000957	37.68	30.36	1.01	-0.52	-0.92	6.19	8.00
P-19	RR Ave	I-4	J-1	153.00	10.60	0.80	8.48	59.19	10.00	38.87	Circular	42 inch	Concrete	0.013	0.000980	31.50	38.31	3.98	-0.92	-1.07	5.79	8.00
P-17		I-14	I-13	44.00	1.43	0.80	1.14	1.14	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005000	2.52	0.38	0.48	6.42	6.20	7.53	9.00
P-16		I-13	I-12	374.00	0.00	0.80	0.00	1.14	10.00	11.51	Circular	12 inch	Concrete	0.013	0.005027	2.53	0.41	0.52	6.20	4.32	7.52	9.00
P-15		I-12	I-11	537.00	1.24	0.80	0.99	2.14	10.00	23.55	Circular	12 inch	Concrete	0.013	0.004972	2.51	1.11	1.41	4.32	1.65	7.45	8.00
P-13		I-10	I-11	99.00	1.11	0.80	0.89	0.89	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005051	2.53	0.30	0.38	2.15	1.65	6.94	8.00
P-12		I-11	J-1	321.00	1.08	0.80	0.86	3.89	10.00	29.88	Circular	12 inch	Concrete	0.013	0.005140	2.55	2.27	2.89	1.65	0.00	6.87	8.00
P-14		I-8	I-9	79.00	1.31	0.80	1.05	1.05	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005063	2.54	0.35	0.44	1.15	0.75	5.62	8.00
P-10		I-9	J-1	149.00	0.90	0.80	0.72	1.77	10.00	12.97	Circular	12 inch	Concrete	0.013	0.005034	2.53	0.67	0.85	0.75	0.00	5.62	7.00
P-5		J-1	I-5	61.00	N/A	N/A	N/A	64.85	N/A	39.51	Circular	42 inch	Concrete	0.013	0.000984	31.55	42.26	4.39	-1.07	-1.13	5.32	6.00
P-6	slough	I-5	I-6	244.00	5.29	0.80	4.23	69.08	10.00	39.74	Box	6 x 5 ft	Concrete	0.045	0.000984	38.20	45.13	1.50	-1.13	-1.37	5.22	8.00
P-7	slough	I-6	I-7	267.00	8.11	0.80	6.49	75.57	10.00	42.44	Box	6 x 5 ft	Concrete	0.045	0.000936	37.27	50.63	1.69	-1.37	-1.62	4.88	8.00
P-8	slough	I-7	Outlet	419.00	9.58	0.80	7.66	83.23	10.00	45.08	Box	6 x 5 ft	Concrete	0.045	0.000907	36.68	57.09	1.90	-1.62	-2.00	4.42	7.00

Legacy Development Area - North - Pump Station

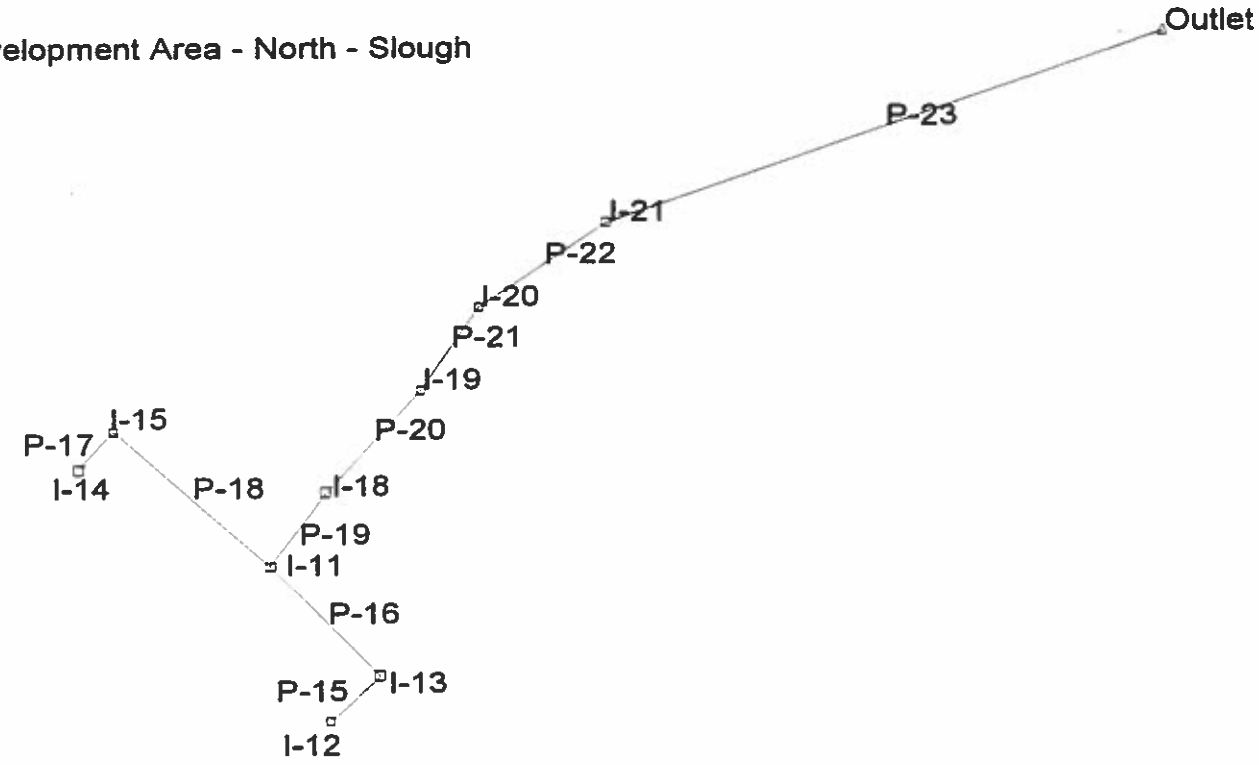


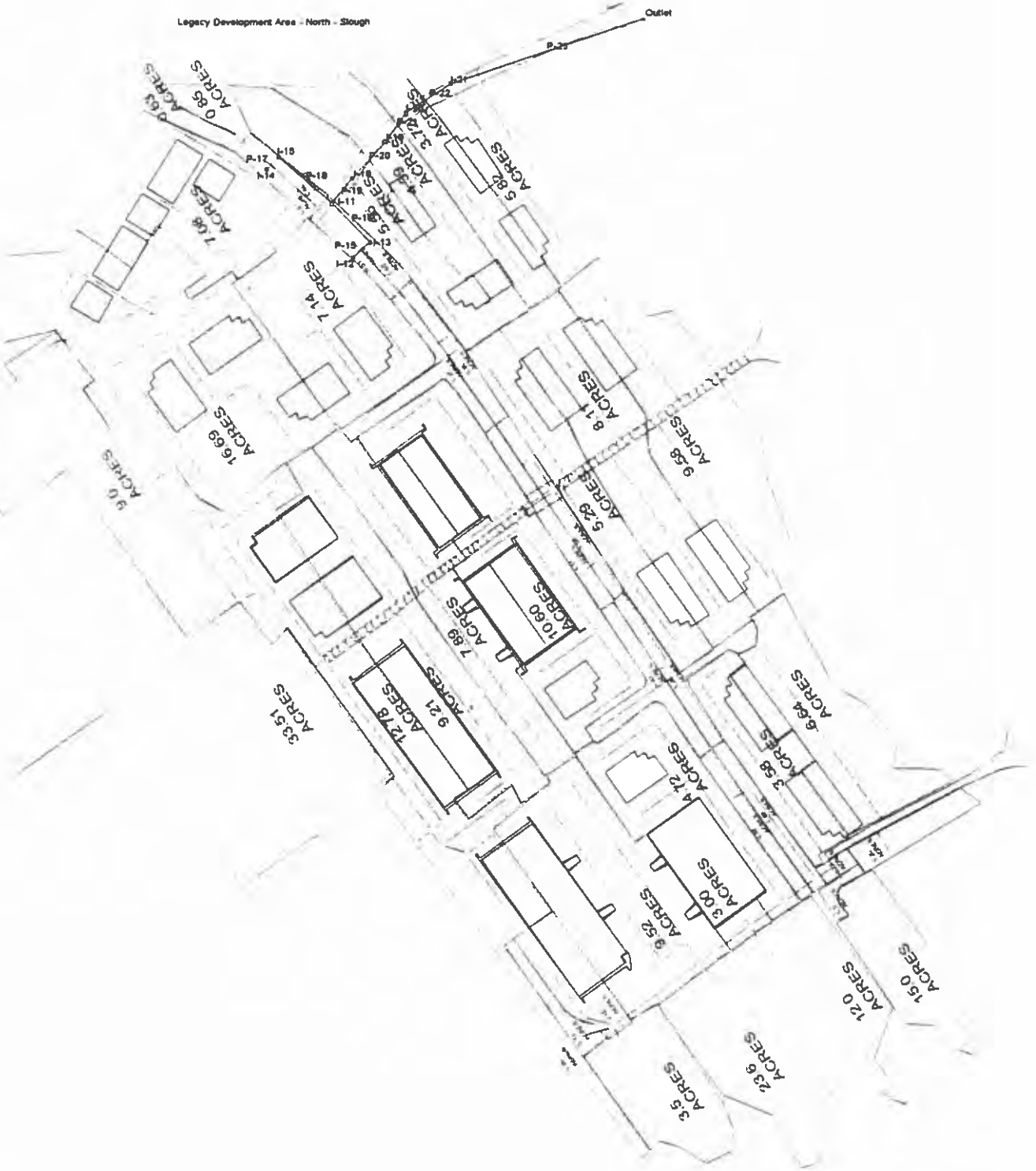

Legacy Development Area - North - Pump Station
Pump Station Inlet
Capacity = 1,200 GPM
P-11
P-25
P-23
P-24
P-4
P-2
P-1
P-3
L-22
L-4
L-3
L-1
L-2
7.09 ACRES
16.69 ACRES
5.56 ACRES
5.64 ACRES
8.11 ACRES
5.29 ACRES
10.60 ACRES
7.89 ACRES
12.78 ACRES
9.21 ACRES
33.51 ACRES
6.64 ACRES
3.29 ACRES
4.72 ACRES
3.00 ACRES
9.32 ACRES
23.6 ACRES

Mare Island Repo[illegible] - Legacy Area

Pipe	Description	Up Node	Dn Node	Length (ft)	Inlet A (acres)	C	Inlet CA (acres)	Tot CA (acres)	TC (min)	Sys Flow Time (min)	Shape	Size	Sectio Material	Roughness	S (ft/ft)	Cap (cfs)	Q (cfs)	V avg (ft/s)	Up Invert (ft)	Dn Invert (ft)	Up HGL (ft)	Up Rim (ft)
P-3		I-3	I-4	107.00	9.00	0.80	7.20	7.20	10.00	10.00	Circular	12 inch	Concrete	0.013	0.022804	5.38	2.40	3.05	-1.56	-4.00	2.63	4.50
P-4		I-4	J-1	195.00	0.00	0.80	0.00	7.20	10.00	10.58	Circular	12 inch	Concrete	0.013	0.005128	2.55	2.46	3.13	-4.00	-5.00	2.06	3.00
P-1		I-1	I-2	66.00	0.65	0.80	0.52	0.52	10.00	10.00	Circular	12 inch	Concrete	0.013	0.006061	2.77	0.17	0.22	-3.40	-3.80	1.14	5.00
P-2		I-2	J-1	234.00	0.00	0.80	0.00	0.52	10.00	14.99	Circular	12 inch	Concrete	0.013	0.005128	2.55	0.21	0.27	-3.80	-5.00	1.14	5.00
P-24		J-1	I-22	305.00	N/A	N/A	N/A	7.72	N/A	29.43	Circular	15 inch	Concrete	0.013	0.005246	4.68	4.47	3.64	-5.00	-6.60	1.01	3.00
P-25		I-22	I-7	361.00	16.69	0.80	13.35	21.07	10.00	30.82	Circular	21 inch	Concrete	0.013	0.005263	11.49	12.44	5.17	-6.60	-8.50	-0.70	2.00
P-11		I-9	I-7	58.00	7.08	0.80	5.66	5.66	10.00	10.00	Circular	12 inch	Concrete	0.013	0.005172	2.56	1.88	2.40	-8.20	-8.50	-2.77	2.50
P-26	Pump Stn	I-7	Pump	45.00	0.00	0.80	0.00	26.74	10.00	31.99	Circular	21 inch	Concrete	0.013	0.006667	12.94	16.01	6.65	-8.50	-8.80	-3.34	2.50

Legacy Development Area - North - Slough




Legacy Development Area - North - Slough
Outlet
P-25
P-22
P-20
P-19
P-18
P-17
P-16
P-15
I-34
I-31
I-22
I-21
I-20
I-19
I-18
I-17
I-16
I-15
I-14
I-13
I-12
0.63 ACRES
0.85 ACRES
7.08 ACRES
3.72 ACRES
5.49 ACRES
5.82 ACRES
5.58 ACRES
7.14 ACRES
16.69 ACRES
9.0 ACRES
8.11 ACRES
9.58 ACRES
5.29 ACRES
10.60 ACRES
7.89 ACRES
33.51 ACRES
12.78 ACRES
9.21 ACRES
6.64 ACRES
3.58 ACRES
4.12 ACRES
3.00 ACRES
9.52 ACRES
15.0 ACRES
12.0 ACRES
23.6 ACRES
3.5 ACRES

Mare Island Rep - Legacy Area

Pipe	Description	Up Node	Dn Node	Length (ft)	Inlet A (acres)	C	Inlet CA (acres)	Tot CA (acres)	TC (min)	Sys Flow Time (min)	Shape	Size	Sectio Material	Roughness	S (ft/ft)	Cap (cfs)	Q (cfs)	V avg (ft/s)	Up Invert (ft)	Dn Invert (ft)	Up HGL (ft)	Up Rim (ft)
P-17		I-14	I-15	69	0.81	0.80	0.65	0.65	10	10	Circular	12 inch	Concrete	0.013	0.005072	2.54	0.22	0.27	2.35	2.00	5.83	6.20
P-18		I-15	I-11	275	0.46	0.80	0.37	1.02	10	14	Circular	12 inch	Concrete	0.013	0.005055	2.53	0.40	0.51	2.00	0.61	5.82	6.20
P-15		I-12	I-13	89	8.96	0.80	7.17	7.17	10	10	Circular	15 inch	Concrete	0.013	0.005056	4.59	2.38	1.94	2.10	1.65	6.38	7.20
P-16		I-13	I-11	206	1.55	0.80	1.24	8.41	10	11	Circular	15 inch	Concrete	0.013	0.005049	4.59	2.89	2.36	1.65	0.61	6.20	7.20
P-19		I-11	I-18	123	33.50	0.80	26.80	36.22	10	23	Circular	24 inch	Concrete	0.013	0.004959	15.93	18.67	5.94	0.61	0.00	5.46	9.10
P-20	slough	I-18	I-19	187	5.56	0.80	4.45	40.67	10	23	Box	5 x 5 ft	Concrete	0.045	0.001604	38.37	21.11	0.89	0.00	-0.30	4.62	6.00
P-21	slough	I-19	I-20	135	4.39	0.80	3.51	44.18	10	27	Box	5 x 5 ft	Concrete	0.045	0.001481	36.87	24.49	1.00	-0.30	-0.50	4.55	6.00
P-22	slough	I-20	I-21	204	3.72	0.80	2.98	47.16	10	29	Box	5 x 5 ft	Concrete	0.045	0.001422	36.12	27.21	1.09	-0.50	-0.79	4.49	6.00
P-23	slough	I-21	Outlet	783	5.82	0.80	4.66	51.82	10	32	Box	5 x 5 ft	Concrete	0.045	0.001545	37.66	31.16	1.25	-0.79	-2.00	4.33	6.00

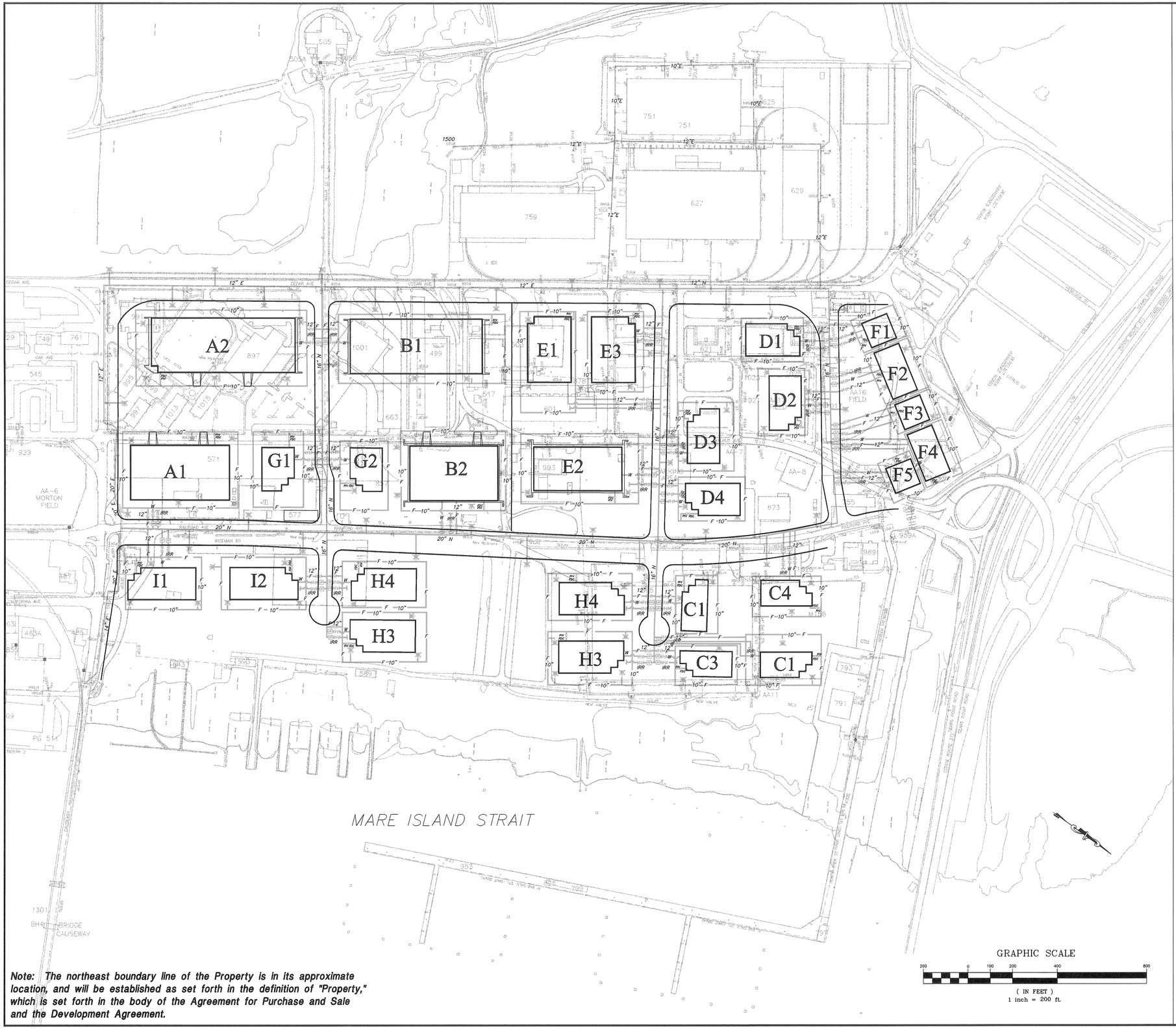
INFRASTRUCTURE PLAN NORTH MARE ISLAND BUSINESS PARK

WATER SYSTEM MASTER PLAN

LEGEND

ALL LOCATIONS APPROXIMATE

- 12" E — EXISITING WATER LINE TO REMAIN
- 16" N — PROPOSED WATER LINES
- FIRE HYDRANT
- WATER METER
- POST INDICATOR AND FIRE DEPARTMENT CONNECTION
- F — FIRE SERVICE WITH BACKFLOW PREVENTER
- W — POTABLE WATER SERVICE
- IRR — IRRIGATION SERVICE



GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

Note: The northeast boundary line of the Property is in its approximate location, and will be established as set forth in the definition of "Property," which is set forth in the body of the Agreement for Purchase and Sale and the Development Agreement.

Date: July 25, 2001

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VALLEJO, CA 94592
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FAX (707) 562-7177

EXHIBIT 1

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INFRASTRUCTURE PLAN NORTH MARE ISLAND BUSINESS PARK

SANITARY SEWER SYSTEM MASTER PLAN

LEGEND

ALL LOCATIONS APPROXIMATE

- (S) — PROPOSED SANITARY LINE MANHOLE
- S41 — PROPOSED SANITARY SEWER LINE
- CO — CLEANOUT IN BUILDING
- PS — PROPOSED OR EXISTING PUMP STATION
- FM — PROPOSED FORCE MAIN

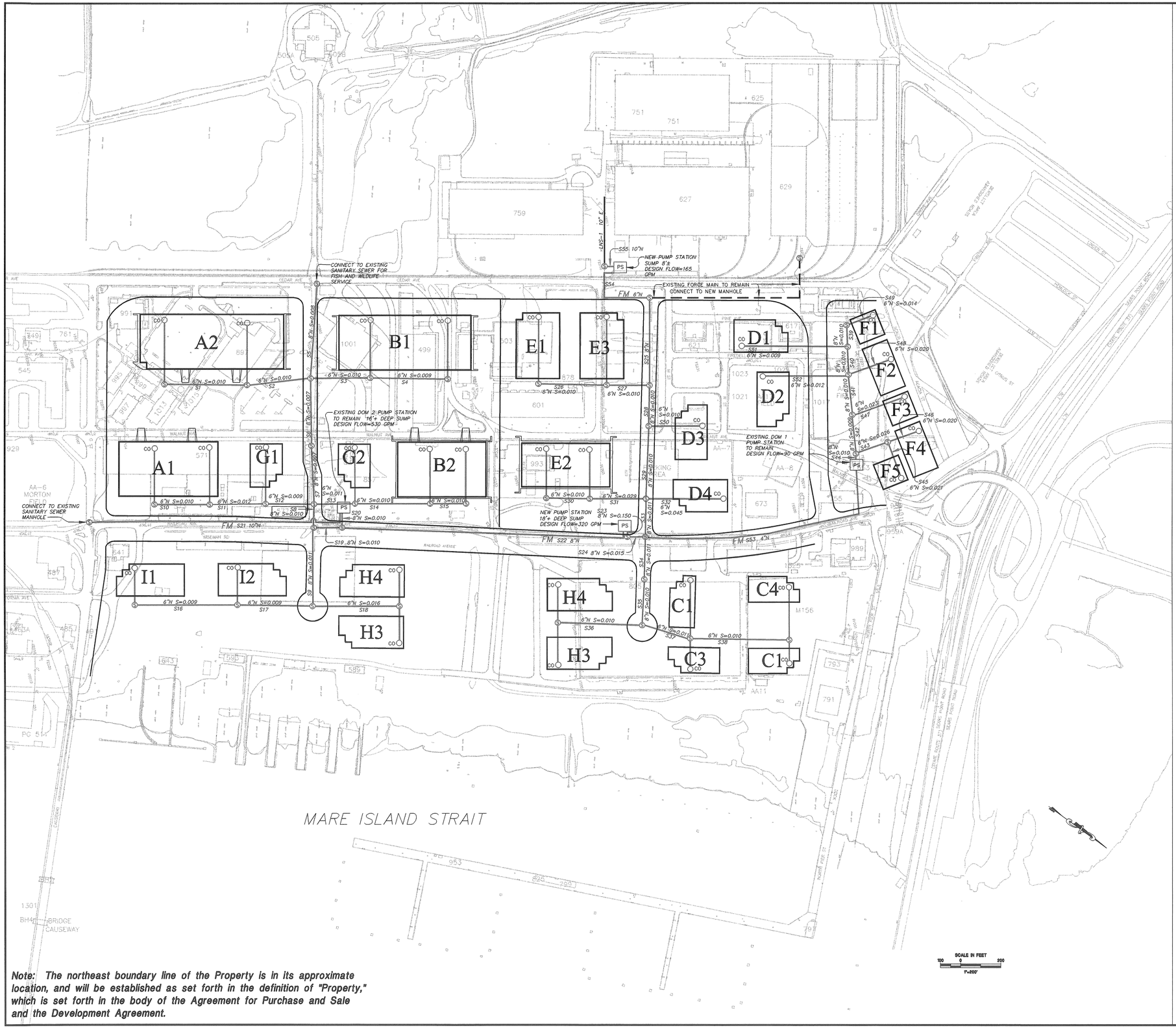

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EXHIBIT 2

INFRASTRUCTURE PLAN NORTH MARE ISLAND BUSINESS PARK

STORM WATER DRAINAGE SYSTEM MASTER PLAN

LEGEND

ALL LOCATIONS APPROXIMATE

- PROPOSED CURB INLET
- PROPOSED CATCH BASIN
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED OUTFALL STRUCTURE
- PROPOSED STORM DRAIN LINE
- PROPOSED STORM DRAIN PUMP STATION
- FM FORCE MAIN

BUILDING 503 INSTALLATION RESTORATION AREA

PHENOL CONTAMINATED GROUNDWATER EXCEEDING THE SCREENING LEVEL

IR-17 INVESTIGATIVE AREA

EXTENT OF PHENOL CONTAMINANTED GROUNDWATER

CONNECT TO EXISTING STORM DRAIN

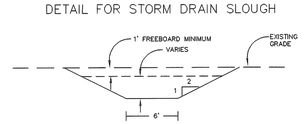
MANHOLE OVER EXISTING STORM DRAIN

A2 A1 G1 G2 B2 B1 E1 E3 E2 D1 D2 D3 D4 F1 F2 F3 F4 F5 I1 I2 H4 H3 C1 C3 C4

PROPOSED SLOUGH TYP. SEE DETAIL

MARE ISLAND STRAIT

DETAIL FOR STORM DRAIN SLOUGH



SCALE IN FEET 100 0 200 1"=200'

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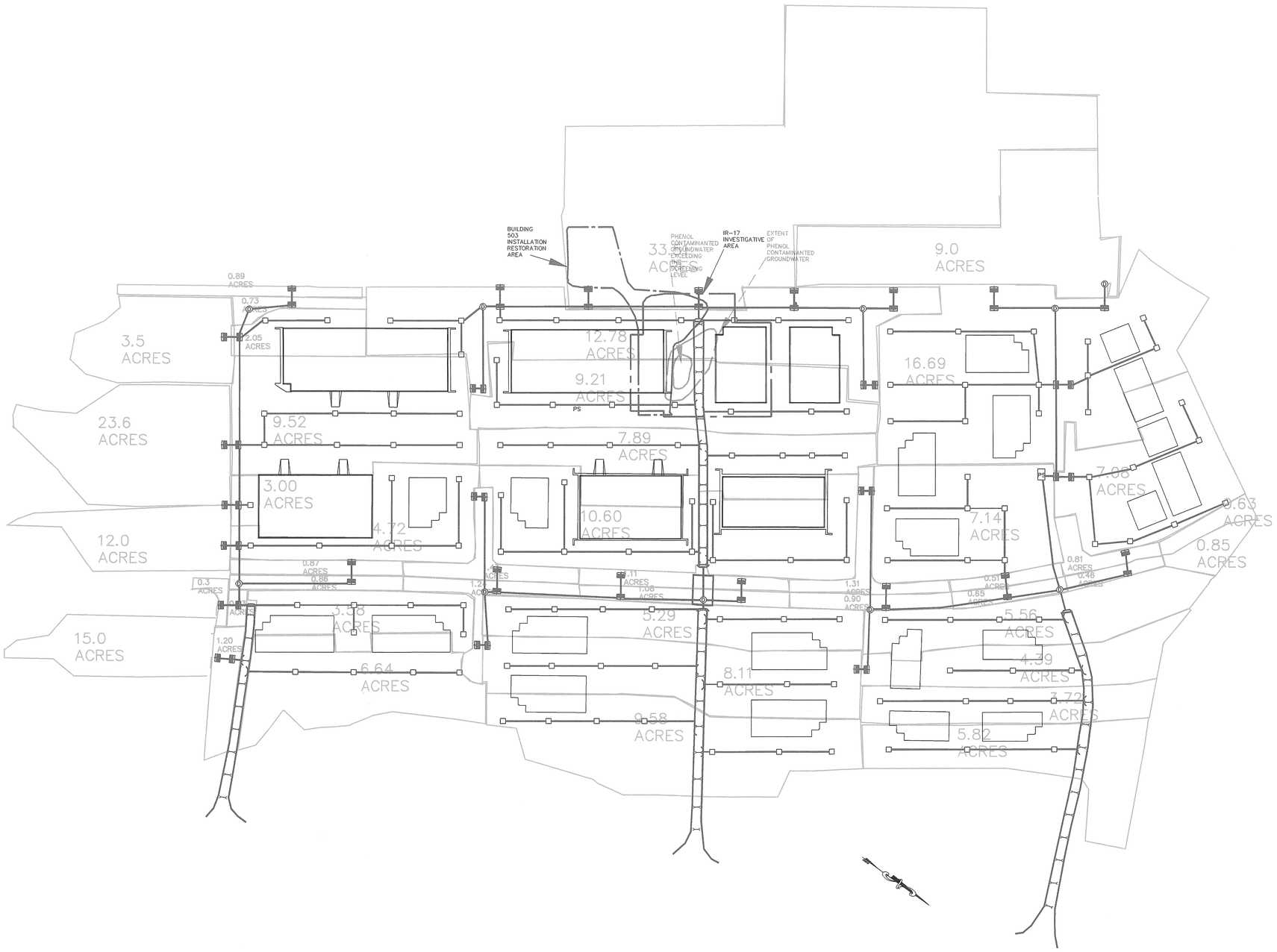
EXHIBIT 3

INFRASTRUCTURE PLAN NORTH MARE ISLAND BUSINESS PARK

STORM DRAIN SYSTEM MASTER PLAN DRAINAGE BASINS



LEGEND

ALL LOCATIONS APPROXIMATE

- PROPOSED CURB INLET
- PROPOSED CATCH BASIN
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED OUTFALL STRUCTURE
- PROPOSED STORM DRAIN LINE
- PROPOSED STORM DRAIN PUMP STATION
- FM FORCE MAIN
- DRAINAGE BASIN BOUNDARIES

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EXHIBIT 3

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