OPERATING SUMMARY

WATER POLLUTION CONTROL PROJECTS

1973

Ontario

Ministry of the Environment

Hon. William G. Newman, Minister
Everett Biggs, Deputy Minister

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WATER POLLUTION CONTROL PROJECTS

operated by the Ministry of the Environment

prepared by
Technical Services Branch
July, 1974

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projects included in report

PROJECT	CAPACITY mgd	RECEIVING WATER
PRIMARY TREATMENT PLANTS		
1. Cornwall	8.	St. Lawrence R.
2. Espanola	0.66	Spanish River
3. Fort Frances	2.	Rainy River
4. Midland	1.25	Georgian Bay
5. Owen Sound	3.	Owen Sound
6. Parry Sound	0.8	McCurry Lake
7. Point Edward	0.57	St. Clair River
8. Port Dover	2.1	Lake Erie
9. Prescott	1.	St. Lawrence R.
10. Sault Ste. Marie	8.	St. Mary's River
11. Thunder Bay North	4.	McIntyre River
12. Thunder Bay South	6.	Kaministikwia R.
13. Timmins	3.	Mattagami R.
14. Trenton	1.	Bay of Quinte
EXTENDED AERATION PLANTS		
15. Alliston	0.8	Boyne River
16. Burlington Skyway	6.	Hamilton Harbour
17. Cayuga	0.2	Grand River
18. Deseronto	0.3	Lake Ontario
19. Eganville	0.17	Bonnchere R.
20. Elora	0.08	Grand River
21. Grand Valley	0.13	Grand River
22. Ignace	0.25	Agimac Creek
23. Moore Twp. (Corunna)	0.32	St. Clair River
24. Moosonee	0.075	Store Creek
25. Paris	0.5	Grand River
26. Port McNicoll	0.23	Georgian Bay
27. Westminster Twp.	0.25	Dingman Creek
28. Woolwich Twp. (St. Jacobs)	0.21	Grand River
CONTACT STABILIZATION PLANTS		
29. Ear Falls	0.20	English River
30. Haileybury	0.35	Lake Timiskaming
31. Longlac	0.25	Suicide River
32. Red Lake	0.25	Howey Bay
HIGH RATE ACTIVATED SLUDGE PLANTS		
33. Bradford	0.8	Schomberg River
34. Carleton Place	1.2	Mississippi River
35. Hespeler	1.6	Grand River
36. Meaford	0.86	Georgian Bay

PROJECTS	CAPACITY mgd	RECEIVING WATER
HIGH RATE ACTIVATED SLUDGE PLANTS		
37. Palmerston	0.25	Maitland River
38. Sudbury	15.	Junction Creek
TRICKLING FILTER PLANT		
39. Frankford	0.12	Trent River
CONVENTIONAL ACTIVATED SLUDGE PLANTS		
40. Belleville	8.	Bay of Quinte
41. Brantford	12.5	Grand River
42. Burlington D. L.	2.5	Lake Ontario
43. Burlington E.G.	0.75	Lake Ontario
44. Campbellford	0.8	Trent River
45. Chatham	4.5	Thames River
46. Coniston	.32	Coniston Creek
47. Elmira	0.68	Canangagique Cr.
48. Fergus	1.1	Grand River
49. Galt	8.5	Grand River
50. Georgetown	1.5	Silver Creek
51. Hagersville	0.2	Sandusk Creek
52. Huntsville	0.25	Muskoka River
53. Ingersoll	2.25	Thames River
54. Kingston Twp.	0.8	Lake Ontario
55. Kitchener	13.5	Grand River
56. Markham	0.66	Rouge River
57. Newmarket	2.	Holland River
58. North Bay	4.	Lake Nipissing
59. Orangeville	0.75	Credit River
60. Pickering	0.4	Duffin's Creek
61. Preston	1.8	Grand River
62. Richmond Hill	1.6	German Mills Cr.
63. St. Mary's	0.8	Thames River
64. Sidney Twp. (Batawa)	0.12	Trent River
65. Simcoe	2.	Lynn River
South Peel		
66. - Clarkson	2.25	Lake Ontario
67. - Erindale	0.4	Credit River
68. - Lakeview	37.	Lake Ontario
69. - Malton	0.75	
70. - Streetsville	0.8	Credit River
71. Stratford	6.	Avon River
72. Sturgeon Falls	1.0	Lake Nipissing
73. Tillsonburg	1.8	Otter Creek

PROJECT	CAPACITY	RECEIVING WATER
CONVENTIONAL ACTIVATED SLUDGE PLANTS (cont'd)		
74. Vanastra		
75. Wallaceburg	1.5	Sydenham R.
76. Waterdown	0.3	Grindstone Cr.
77. Waterloo	6.	Grand River
SINGLE CELL INSTALLATIONS	acres	
78. Black River Twp. (Val Gagne)	23.5	Black River
79. Black River Twp. (Ramore)	2.75	Black River
80. Brighton	13.6	Butler Creek
81. Chesterville	14.	South Nation R.
82. Dutton	10.	Ditch to L. Erie
83. Elmvale	4.4	Wye River
84. Emo Township	10.	Rainy River
85. Fauquier Twp. (Moonbeam)	6	Groundhog R.
86. Haileybury (N. Cobalt)	10.	Ottawa River
87. Little Current	10	Georgian Bay
88. Lucan	5.	Ausable River
89. Markdale	14.	Sangeen River
90. Milverton	15	Maitland River
91. Powassan	7	Genesee River
92. Richmond	10	Jock River
93. Rockland	20	Ottawa River
94. Sutton	16	Black River
95 Waterford	15	Nanticoke Cr.
96. Winchester	12.	Castor River
MULTI-CELL INSTALLATIONS		
97. Alexandria	42.	Delisle River
98. Almonte	45.	Mississippi River
99. Arthur	17.5	Grand River
100. Aylmer	72.	Catfish Creek
101. Beaverton	28	Lake Simcoe
102. Beeton	15	Beeton Creek
103. Bracebridge	32.	Muskoka R.
104. Cannington	28.	Beaverton River
105. Chesley	17.	Saugeen River
106. Englehart	20.	Englehart R.

PROJECT	SIZE acres	RECEIVING WATER
107. Ernestown Twp. (Amherstview)	36.	Napanee River
108. Essex	58	Canard River
109. Exeter	22	Ausable River
110. Forest	40	Hickory Creek
111. Gananoque	70	Gananoque R.
112. Harriston	28	Maitland River
113. Hearst	62	Mattawishkwia R.
114. Kincardine	32	Georgian Bay
115. Lakefield	24	Otanabee River
116. Lindsay	111.	Scugog River
117. Madoc	30	Moira Lake
118. Mattawa	18	Mattawa River
119. Michipicoten Twp. (Wawa)	40.	Magpie River
120. Mitchell	67	Thames River
121. Neelon & Garson	26	Junction Creek
122. New Hamburg	28.	Grand River
123. New Liskeard	43	L. Timiskaming
124. Petrolia	32	Sydenham R.
125. Port Perry	40	Nonquon River
126. Port Rowan	21	Lake Erie
127. Port Stanley	40	Lake Erie
128. Ridgetown	40	Thames River
129. Seaforth	45	Bayfield River
130. Shelburne	13	Nottawasaga R.
131. Stayner	20	Lamont Creek
132. Stirling	12.6	Rawdon Creek
133. Tavistock	30.	Thames River
134. West Lorne	20.	Ditch to L. Erie
135. Wiarton	15.	Georgian Bay
136. Wingham	30	Maitland River

MISCELLANEOUS PROJECTS

PROJECT	DESCRIPTION
137. Bancroft	Pumping Station and Septic Tank
138. Durham	Pumping Stations and 0.29 MGD aerated lagoon
139. Listowel	Pumping Stations, 1.5 acre aerated lagoon and 70 acres conventional ponds.

introduction

Project Operations Branch of the Ministry of the Environment operates more than 450 water and sewage projects in the Province of Ontario. In order to facilitate operational control and long-term evaluation, up-to-date statistics are maintained on process parameters and on operating costs for each project. This summary has been compiled from data collected during 1973 from 77 mechanical treatment plants, 59 facultative waste stabilization ponds, two aerated lagoons, and one municipal septic tank.

During the year a total of 73 billion gallons of sewage was treated by these projects, 68 billion gallons at water pollution control plants and 5 billion gallons by waste stabilization ponds. The cost of operating the 77 plants was 6.6 million dollars, of which 3.0 million dollars were spent on staff salaries and 1.0 million dollars on sludge disposal. Some of the operating expenditures will not reflect the final cost borne by the municipalities because of cost apportionment of shared resources and rebates for nutrient removal studies.

Flow diagrams and design data normally included in the individual operating summaries for staff water pollution control plants are included in this report as an appendix.

More detailed information on the operation of staffed plants can be obtained in operating summaries for the individual projects.

Water Pollution Control Plants

PLANT PERFORMANCE

LOADING

Hydraulic and organic loading data, together with design loading values are summarized in Table I for primary treatment plants and modified activated sludge plants (extended aeration, contact stabilization and high rate plants) and in Table II for conventional activated sludge plants.

PLANT PERFORMANCE

Unweighted arithmetic mean values of biochemical oxygen demands and suspended solids concentrations for plant influent and plant effluent are shown in Tables III and IV along with the number of samples taken. These results include both samples sent to the Ministry of the Environment laboratories and those analysed at the plant. The number of samples can be used as a relative measure of the reliability of the averages listed. In most cases the samples were 8-hour composites taken during the normal working day.

Average total phosphorus and nitrogen (free ammonia, total Kjeldahl, and oxides of nitrogen) concentrations are listed in Table V for primary treatment plants and modified activated sludge plants and in Table VI for conventional activated sludge plants.

Tables VII, VIII, IX and X, are summaries of analyses for othe pollutants. There is no regular sampling program for metals or phenols : the samples are taken when industrial discharges are suspected. Hence, these results should not be taken as representative of sewage characteristics through out the year at any plant.

Table I

PLANT LOADING

PROJECT	HYDRAULIC LOADING						ORGANIC LOADING					
	DESIGN CAPACITY	AVERAGE DAILY FLOW	MAXIMUM DAY'S FLOW	MAXIMUM RATE	AVG FLOW as % of DESIGN	% of year DAILY FLOW exceeded DESIGN	DESIGN LOADING in pounds per day		ACTUAL LOADING in pounds per day		% of DESIGN	
	MGD	million gallons	million gallons	MGD			BOD	SUSP SOLIDS	BOD	SUSP SOLIDS	BOD	SUSP SOLIDS
PRIMARY TREATMENT PLANTS												
Cornwall	8.25	11.	21.	24.	133	90			14000	18000		
Espanola	.66	.40	1.4		61	9			750	700		
Fort Frances	2.00	2.1	4.3	6.0	105	48	2600	3600	1300	2300	50	64
Midland	1.25	1.7	3.2	5.1	136	89	2810	3750	1600	3300	57	88
Owen Sound	3.0	4.9	9.6	10.	163	93	5400	6000	5200	11000	96	183
Parry Sound	.83	.85	2.3	3.0	102	38	2080	1660	880	1400	42	84
Point Edward	.57	.23	.41	.55	40	0	970	1140	480	760	49	67
Port Dover	2.1	.53	1.4	3.0	25	0	4410	6200	1600	1500	36	24
Prescott	1.0	1.0	3.7		100	38			800	1600		
Sault Ste Marie	8.0	11.	23.	31.	138	17	20000	16000	14000	16000	70	100
Thunder Bay North	4.0	6.4	8.0	8.0	160	100			8300	9000		
Thunder Bay South	6.0	5.9	18.	23.	98	34			7700	7700		
Timmins	4.0	3.8	9.9	9.4	95	29	5400	6000	4500	6000	83	100
Trenton	1.0	2.8	5.0	6.3	280	100	2500	2000	6200	5000	248	250
EXTENDED AERATION PLANTS												
Alliston	.8	.40	.86	2.5	50	1			1000	700		
Burlington Skyway	6.0	9.4	15.	15.	157	98	12500	12500	13000	23000	104	184
Cayuga	.2	.10	.59		50	3			140	130		
Deseronto	.3	.11	.46	1.0	37	1	590	670	250	280	72	42
Eganville	.17	.10	.20	.48	59	6	340		1100	610	324	
Elora	.083	.16	.29	.34	193	90	175	208	220	290	126	139
Grand Valley	.13	.073 a	1.4		56	2			950	10000		
Ignace	.25	.10	.19		40	0			90	84		
Moore Twp. (Corunna)	.32	.17	.47	1.2	53	1	480	480	300	300	63	63
Moosonee	.075	.048	.13		64	3	190	190	53	110	28	58
Paris	.50	.26	.52	.98	52	3	1000	850	390	340	39	40
Port McNicoll	.23											
Westminster Twp.	.25	.34	.66		136	83			540	750		
Woolwich Twp.	.16	.13	.40	.80	81	18			620	650		
CONTACT STABILIZATION PLANTS												
Ear Falls	Not Available											
Haileybury	.35	.50	1.1	.95	143	87	595	700	700	900	118	129
Longlac	.25	.11 b	.22		44	0			120	130		
Red Lake	.25	.07	.18		28	0	600	600	63	91	11	15
HIGH RATE ACTIVATED SLUDGE PLANT												
Bradford	.8	.39	1.1	1.8	49	4	2060	2300	1500	2100	73	91
Carleton Place	1.2	1.4	2.7	3.0	117	62			460	760		
Hespeler	2.0	1.9	1.9	5.0	70	0			4800	2500		
Meaford	.86	.70	1.7	2.5	81	18	3440		600	800		
Palmerston	.25	.19	.29		76	9			110	290		
Sudbury	15.	11.	19.	28.	73	6			15000	17000		
TRICKLING FILTER PLANT												
Frankford	.54/.12	.20	.44		37/167	0/81			170	200		

a. From Jan. 23
b. From July 31

Table II

PLANT LOADING

PROJECT	HYDRAULIC LOADING						ORGANIC LOADING					
	DESIGN CAPACITY	AVERAGE DAILY FLOW	MAXIMUM DAY'S FLOW	MAXIMUM RATE	AVG FLOW as % of DESIGN	% of year DAILY FLOW exceeded DESIGN	DESIGN LOADING in pounds per day		ACTUAL LOADING in pounds per day		% of DESIGN	
	MGD	million gallons	million gallons	MGD			BOD	SUSP SOLIDS	BOD	SUSP SOLIDS	BOD	SUSP SOLIDS
CONVENTIONAL ACTIVATED SLUDGE PLANTS												
Belleville	8.0	7.1	18.		89	24	10400	14000	8500	15000	82	107
Brantford	12.5	9.8	16.	18.	78	2	21300	21900	16000	24000	75	110
Burlington D. L.	2.5	1.7	3.5	4.0	68	13	5000	4500	2700	5300	54	118
Burlington E. G.	.75	.93	2.5	2.5	124	37	1900	2100	1200	1400	63	67
Campbellford	1.0	1.6	1.9	2.0	160	100			800	1400		
Chatham	4.5	4.7	13.	20.	104	45	11300	11300	8500	12000	75	106
Coniston	.35	.44	.91		126	83	520	650	750	840	144	129
Elmira	.68	.50	1.2		74	11	2850	2080	1000	700	35	34
Fergus	1.1	.63	1.9	2.4	57	4	2200	2200	760	1100	35	50
Galt	8.5	5.3	16.	18.	62	52	21000	21000	7400	6900	35	33
Georgetown	1.5	2.1	3.3	4.3	140	91	3000	3000	3200	4200	107	140
Hagersville	.2	.41	.87		205	99			360	400		
Huntsville	.25	.39	.60	.77	156	97	625	625	430	390	69	62
* Ingersoll	2.25	.80			36				1400	2400		
Kingston Twp.	.83	1.6	2.4	2.5	193	100	1740	2080	4500	4200	259	202
Kitchener	13.5	14.	21.	28.	102	75	40500	60800	29000	42000	72	69
Markham	.67	1.0	2.0	2.0	149	96	1440	1670	1500	1800	104	108
Newmarket	2.0	1.8	8.3	8.0	90	16	4400	4240	3200	5800	73	138
North Bay	4.0	6.1	8.2	11.	153	100	6000		5700	11000	95	
Orangeville	.75	1.2	1.7	1.7	160	100	1500	1880	1300	1800	87	96
Pickering	.4	.24	.74	.75	60	10	880	1000	1000	1900	114	190
Preston	1.8	2.1	3.5	7.7	117	73	5400	6300	13000	18000	248	284
Richmond Hill	1.6	1.9	3.0	3.0	119	70	3200	3520	3500	7600	109	216
St. Mary's	.8	.31	.85		39	0			590	650		
Sidney Twp. (Batawa)	.12	.16	.44	.44	133	76	264	300	150	200	57	67
Simcoe	2.0	1.5	2.7	6.5	75	7	4400	4600	4000	3500	91	76
South Peel												
- Clarkson	2.25	3.2	5.7	7.6	147	79			6500	9300		
- Erindale	.4	.46	1.3	2.0	115	62			640	860		
- Lakeview	37.0	25.			77		85000	94000	85500	93000	101	99
- Malton	.75	.78	1.8	2.0	104	67			970	1200		
- Streetsville	.8	.53	1.4	2.4	66	9	1920	2080	1100	1300	57	63
Stratford	6.0	3.6	11.	17.	60	8	5300	7700	6100	9000	115	117
Sturgeon Falls	1.0	1.2	2.2	5.0	120	14			1000	800		
Tillsonburg	1.8	.80	1.4	2.6	44	0	1300	2200	960	2200	74	100
Vanastra	not available											
Wallaceburg	1.5	.49	2.8	3.8	33	0	3000	3750	390	450	13	12
Waterdown	.3	.14	.37	.60	47	2	200	210	210	340	105	162
Waterloo	6.0	5.9	11.	20.	98	44	16000	14000	14000	9400	88	67

* Ingersoll est. flow from billing sheets

Table III

PLANT PERFORMANCE

PROJECT	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS					
	PLANT INFLUENT		PLANT EFFLUENT			REDUCTION	PLANT INFLUENT		PLANT EFFLUENT			REDUCTION
	NUMBER of SAMPLES	AVERAGE BOD mg/l	NUMBER of SAMPLES	AVERAGE BOD mg/l	% of samples greater than 15 mg/l	percent	NUMBER of SAMPLES	AVERAGE S.S CONCn mg/l	NUMBER of SAMPLES	AVERAGE S.S CONCn mg/l	% of samples greater than 15 mg/l	percent
PRIMARY TREATMENT PLANTS												
Cornwall	14	130	13	130	100	5	87	160	85	100	100	42
Espanola	23	190	23	110	100	42	23	170	23	80	100	53
Fort Frances	60	60	61	41	100	35	60	110	59	50	100	52
Midland	24	95	24	60	96	40	23	190	23	70	100	63
Owen Sound	44	110	45	46	100	58	94	220	95	50	86	77
Parry Sound	17	100	17	40	89	60	16	160	16	30	94	81
Point Edward	10	210	9	100	100	51	10	330	10	120	100	64
Port Dover	35	300	31	130	100	57	73	290	76	90	91	70
Prescott	24	80	22	46	100	40	24	160	22	60	100	60
Sault Ste. Marie	64	130	64	80	100	38	197	150	197	60	100	60
Thunder Bay North	62	130	62	100	100	23	62	140	62	76	100	46
Thunder Bay South	60	130	61	96	100	26	60	130	60	78	100	40
Timmins	23	120	22	50	96	58	87	160	84	64	96	60
Trenton	24	220	24	150	100	32	25	180	25	100	100	44
EXTENDED AERATION PLANTS												
Alliston	81	260	20	20	57	92	83	170	20	30	62	82
Burlington Skyway	12	140	12	10	15	93	57	240	58	14	43	94
Cayuga	26	140	24	8	8	94	26	130	26	16	39	88
Deseronto	36	230	34	11	18	95	37	250	36	8	5	97
Eganville	31	1100	21	11	15	98	31	610	21	17	43	91
Elora	21	140	21	11	32	92	72	180	242	16	62	91
Grand Valley	25	130	25	6	8	81	24	140	25	20	36	86
Ignace	14	90	14	35	93	61	15	85	15	55	93	53
Moore Twp. (Corunna)	65	160	67	8	0	96	65	170	67	10	12	61
Moosonee	18	110	19	13	20	88	19	240	20	20	52	92
Paris	16	150	16	14	31	91	61	130	251	16	37	88
Port McNicoll	Not Available											
Westminster Twp.	24	160	24	7	8	96	24	220	24	8	8	96
Woolwich Twp.	30	480	16	21	18	96	33	500	16	30	71	94
CONTACT STABILIZATION PLANTS												
Ear Falls	11	290	12	40	83	86	11	300	12	50	75	83
Haileybury	20	130	20	6	0	85	22	170	20	30	19	82
Longlac	8	110	8	6	0	95	8	110	8	12	25	89
Red Lake	6	90	8	25	50	72	6	130	8	56	75	57
HIGH RATE ACTIVATED SLUDGE PLANTS												
Bradford	18	400	8	30	89	93	31	550	8	45	78	92
Carleton Place	18	33	17	16	53	51	36	54	34	20	68	63
Hespeler	30	250	28	75	100	70	62	130	61	55	100	59
Meaford	15	85	15	14	24	84	67	120	67	17	41	86
Palmerston	10	54	9	20	40	63	10	150	9	28	80	82
Sudbury	23	140	23	33	46	76	111	160	117	16	36	90
TRICKLING FILTER PLANT												
Frankford	29	90	20	53	95	39	29	100	20	40	95	60

Table IV

PLANT PERFORMANCE

PROJECT	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS					
	PLANT INFLUENT		PLANT EFFLUENT			REDUCTION	PLANT INFLUENT		PLANT EFFLUENT			REDUCTION
	NUMBER of SAMPLES	AVERAGE BOD mg/l	NUMBER of SAMPLES	AVERAGE BOD mg/l	% of samples greater than 15 mg/l	percent	NUMBER of SAMPLES	AVERAGE S·S CONCn mg/l	NUMBER of SAMPLES	AVERAGE S·S CONCn mg/l	% of samples greater than 15 mg/l	percent
CONVENTIONAL ACTIVATED SLUDGE PLANTS												
Belleville	50	120	51	14	41	88	56	210	78	13	26	94
Brantford	100	160	100	18	64	89	241	240	242	19	31	92
Burlington D. L.	12	160	12	13	42	92	26	310	18	15	15	95
Burlington E. G.	11	130	11	16	31	87	19	150	19	11	32	93
Campbellford	27	50	27	9	4	82	77	90	78	13	23	86
Chatham	97	180	97	10	12	94	255	250	257	16	15	94
Coniston	17	170	17	14	28	92	43	190	44	31	75	84
Elmira	85	200	87	24	74	88	85	140	87	60	100	57
Fergus	23	120	44	9	9	93	71	170	279	17	63	90
Galt	63	140	67	20	42	85	226	130	280	39	64	70
Georgetown	17	150	17	30	78	80	78	200	33	17	36	92
Hagersville	11	90	10	13	27	86	11	100	11	21	58	79
Huntsville	15	110	15	10	13	91	16	100	16	19	53	83
Ingersoll	50	180	59	10	20	94	53	300	63	24	25	92
Kingston Twp.	61	290	61	130	100	55	61	270	60	150	100	44
Kitchener	105	210	107	18	56	91	248	300	248	16	40	95
Markham	26	150	26	33	81	78	26	180	26	35	88	81
Newmarket	146	182	141	19	42	90	168	330	80	12	23	96
North Bay	129	93	127	29	77	69	222	180	224	52	98	70
Orangeville	20	110	21	11	19	90	20	150	21	22	67	85
Pickering	10	420	11	7	8	98	62	780	63	12	6	98
Preston	47	640	41	43	56	93	232	850	224	28	67	97
Richmond Hill	23	180	23	11	25	94	22	400	23	19	46	95
St. Mary's	43	190	43	6	0	97	43	210	43	3	0	98
Sidney Twp. (Batawa)	57	96	57	16	16	83	57	130	57	17	35	87
Simcoe	45	260	44	11	20	96	44	230	45	27	58	88
South Peel												
- Clarkson	23	200	23	32	92	84	23	290	23	40	92	86
- Erindale	24	140	24	10	13	93	23	190	23	10	21	95
- Lakeview	22	340	29	22	34	94	22	370	29	32	55	91
- Malton	39	120	20	14	33	89	39	160	18	13	42	92
- Streetsville	24	190	24	19	58	90	24	250	24	21	75	92
Stratford	45	170	42	8	7	95	79	250	54	10	15	96
Sturgeon Falls	5	80	5	4	0	95	15	64	13	6	0	91
Tillsonburg	9	120	10	6	0	95	61	270	62	15	47	94
Vanastra	19	66	20	5	5	91	19	80	20	5	5	94
Wallaceburg	59	80	59	5	0	94	266	90	272	8	11	91
Waterdown	11	150	11	24	58	84	47	240	45	14	53	94
Waterloo	77	240	77	24	55	90	224	160	224	30	70	81

Table V

OTHER MACRO-NUTRIENTS

PROJECT	NUMBER of SAMPLES	TOTAL PHOSPHORUS		AMMONIA		TOTAL KJELDAHL NITROGEN		NITRATE plus NITRITE	
		INFLUENT mg/l P	EFFLUENT mg/l P	INFLUENT mg/l N	EFFLUENT mg/l N	INFLUENT mg/l N	EFFLUENT mg/l N	INFLUENT mg/l N	EFFLUENT mg/l N
PRIMARY TREATMENT PLANTS									
Cornwall	16	3.2	3.3	5	5	13	14	.2	.86
Espanola	23	10.	7.8			33	31		
Fort Frances	9	5.9	4.3			23	19		
Midland	24	13.	12.	13	8	23	17	.2	2.0
Owen Sound	42	4.0	2.4	13	8	18	12	.2	.73
Parry Sound	19	7.0	2.9	14	8	27	15	.3	1.1
Point Edward	10	15.	3.7	29	22	48	34	.11	.15
Port Dover	35	6.6	2.1	15	10	38	20	.1	.2
Prescott	23	3.7	2.5	15	12	18	13	.1	.3
Sault Ste. Marie	14	5.3	3.9	14	12	23	20	.15	.30
Thunder Bay North	12	5.0	4.1	12	10	22	28	.11	.31
Thunder Bay South	12	4.5	3.4	10	8	22	19	.30	.52
Timmins	22	5.4	3.9	20	12	28	22	.18	.25
Trenton	24	5.4	4.3	12	7	26	19	.5	.6
EXTENDED AERATION PLANTS									
Alliston	81	8.0	4.3	11	14	38	8	.12	.11
Burlington Skyway	12	6.7	2.2	13	2	29	3	.1	7.3
Cayuga	28	7.3	1.5			40	2	70.	1.4
Deseronto	9	12.	5.0	24	6	43	5	.1	10.
Eganville	31	30.	7.4	22	.4	80	13	.3	8.7
Elora	21	9.2	4.2	23	20	33	21	.14	.2
Grand Valley	24	8.1	4.3			50	5		
Ignace	15	7.3	6.4			35	19		
Moore Twp. (Corunna)	14	9.1	3.2	28	.3	48	3	.14	14.
Moosonee	19	7.5	2.9			31	6		
Paris	16	5.9	2.4	15	< 5	26	8	1.	3.
Port McNicoll									
Westminster Twp.	24	7.3	1.0	24	4	36	5	.1	7.5
Woolwich Twp.	32	6.8	2.5	3		24	2	.7	10.
CONTACT STABILIZATION PLANTS									
Ear Falls	11	14.	6.0			52	27		
Haileybury	20	6.7	2.3	18	9	37	6	.37	5.1
Longlac	8	8.8	3.3			32	5		
Red Lake	6	8.0	4.9						
HIGH RATE ACTIVATED SLUDGE PLANTS									
Bradford	18	12.	6.9			49	15		
Carleton Place	19	3.0	1.8	7	3	9	5	.1	2.8
Hespeler	28	5.0	4.0			31	21		
Meaford	15	7.8	2.7	14	.3	21	4	.1	5.5
Palmerston	10	4.1	3.3	5		22	10		
Sudbury	18	7.9	3.5	16	5	32	28	.1	2.0
TRICKLING FILTER PLANT									
Frankford	29	4.5	3.7	20	14	25	18	.61	.8

Table VI

OTHER MACRO-NUTRIENTS

PROJECT	NUMBER of SAMPLES	TOTAL PHOSPHORUS		AMMONIA		TOTAL KJELDAHL NITROGEN		NITRATE plus NITRITE	
		INFLUENT mg/l P	EFFLUENT mg/l P	INFLUENT mg/l N	EFFLUENT mg/l N	INFLUENT mg/l N	EFFLUENT mg/l N	INFLUENT mg/l N	EFFLUENT mg/l N
CONVENTIONAL ACTIVATED SLUDGE PLANTS									
Belleville	6	6.8	2.2	14	10	26	14	.5	2.5
Brantford	11	5.5	2.8	10	4	26	7	.1	3.7
Burlington D. L.	12	8.3	4.5	18	10	39	14	.15	5.3
Burlington E. G.	11	7.5	4.4	22	6	35	9	.24	4.9
Campbellford	27	2.6	1.2	3.3	2.4	8	2	1.6	1.7
Chatham	10	16.	6.4			25	4		
Coniston	17	6.5	3.6			27	10		
Elmira	86	7.3	4.6	21	19	39	28	4.7	7.2
Fergus	23	7.8	3.5	28	.4	35	29	.13	30.
Galt	38	9.1	3.0			28	20		
Georgetown	18	7.6	3.2	17	11	34	18	1.0	3.0
Hagersville	11	6.8	3.1			27	7		
Huntsville	16	6.2	.5			25	11		
Ingersoll	46	6.4	1.0	17	8	32	7	.22	4.8
Kingston Twp.	15	9.1	7.4	21	27	45	47	.1	.1
Kitchener	12	8.5	4.2			36	8		
Markham	26	9.1	4.7	21	14	38	21	.3	5.1
Newmarket	64	8.2	1.8	22	.5	56	4		
North Bay	10	8.2	3.5	16	15	29	21	.41	.32
Orangeville	20	6.6	3.8	22	14	24	17	.90	3.6
Pickering	10	22.	1.3	21	2	71	5	.12	.31
Preston	30	10.8	3.3			48	16		
Richmond Hill	23	8.1	4.0			43	6		
St. Mary's	42	5.8	3.3			30	4		
Sidney Twp. (Batawa)	57	3.3	1.6	14	.5	23	3	.2	8.5
Simcoe	46	7.7	1.6	16	2.3	27	4	.55	2.
South Peel									
- Clarkson	23	11.	5.1	13	11	24	15	1.9	1.3
- Erindale	23	10.	4.2	22	2	37	11	.1	
- Lakeview	26	15.	4.9	11	6	55	12	.27	6.2
- Malton	39	6.0	2.9	17	7	30	11	.1	1.0
- Streetsville	24	7.2	3.5	22	7	38	16	.1	2.2
Stratford	26	8.4	3.6	8	2	28	4	1.3	2.5
Sturgeon Falls	5	3.4	1.6	11	.2	18	2	.85	8.8
Tillsonburg	9	5.9	1.4			31	10		
Vanastra	19	3.0	1.7			17	2		
Wallaceburg	9	4.3	2.4	14	< 1	18	1.	.76	11.
Waterdown	11	7.6	4.6	18	8	32	11	.1	8.6
Waterloo	12	7.5	2.3			30	7		

Table VII

OTHER POLLUTANTS

PROJECT	MBAS mg/l LAS		CHLORIDE mg/l Cl^-		SULFATE mg/l SO_4^{-2}		CADMIUM mg/l Cd		CHROMIUM mg/l Cr		COPPER mg/l Cu		LEAD mg/l Pb	
	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.
PRIMARY TREATMENT PLANTS														
Cornwall	2.4	2.6	86	92	100	120								
Espanola	7.7	4.9												
Fort Frances			23											
Midland	3.3	2.9	70	71	84	80								
Owen Sound	2.5	2.1	140	140	46	45								
Parry Sound	4.5	2.0												
Point Edward			61	76										
Port Dover			68	78										
Prescott	2.4	1.7	75	82	55	56			.04	.4	.21	.17		
Sault Ste. Marie	3.7	3.0	50	52	40	40								
Thunder Bay North			41	43										
Thunder Bay South			46	47										
Timmins	3.3	2.5												
Trenton	3.2	2.7	98	90	67	69								
EXTENDED AERATION PLANTS														
Alliston	4.5	.9					.02		.02		.05		.1	
Burlington Skyway	3.1	.2	320	110	180	140								
Cayuga	7.6	.4												
Deseronto	12.	.2	83	100	77	50								
Eganville	4.5	.3	58	57	42	42								
Elora	3.3	.2												
Grand Valley	7.5	.2												
Moore Twp. (Corunna)	6.6	.1	53	57										
Moosonee	5.1	.2												
Woolwich Twp.	3.6	.1					.02	.01	<.01	<.01			.1	<.05
CONTACT STABILIZATION PLANTS														
Haileybury	2.4	.4												
HIGH RATE ACTIVATED SLUDGE PLANTS														
Bradford	3.7	.6												
Carleton Place	1.9	.6	17	22	23	22								
Hespeler	3.8	1.7					.03	.01	.91		.18		.11	
Meaford	3.3	.3	35	37	36	28								
Palmerston	1.4	.2												
Sudbury	5.7	.6	130	140			.02	.02	.05	.03	.58	.05	.23	.17
TRICKLING FILTER PLANT														
Frankford	5.0	3.6	53	47	70	54								

Table VIII

OTHER POLLUTANTS

PROJECT	NICKEL mg/l Ni		ZINC mg/l Zn		PHENOL µg/l C_6H_5OH		IRON mg/l Fe		CALCIUM mg/l Ca		MANGANESE mg/l Mn		MERCURY µg/l Hg		ARSENIC mg/l As	
	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.
PRIMARY TREATMENT PLANTS																
Cornwall																
Espanola																
Fort Frances																
Midland									49	48	18	19				
Owen Sound									58	62	25	23				
Parry Sound																
Point Edward																
Port Dover																
Prescott	< .1	4.9	.35	.23			2.1									
Sault Ste. Marie									45	39	7	9				
Thunder Bay North									50	48	16	17				
Thunder Bay South									48	48	18	18				
Timmins																
Trenton																
EXTENDED AERATION PLANTS																
Alliston	.12		.25								.01					
Burlington Skyway																
Cayuga																
Deseronto																
Eganville																
Elora																
Grand Valley																
Moore Twp. (Corunna)																
Moosonee																
Woolwich Twp.	.05	.05									.1	< .03				
CONTACT STABILIZATION PLANTS																
Haileybury																
HIGH RATE ACTIVATED SLUDGE PLANTS																
Bradford																
Carleton Place																
Hespeler	1.6		1.1								.07		1.		.01	
Meaford									41	42	14	13				
Palmerston																
Sudbury	.49	.36									.19	.25				
TRICKLING FILTER PLANT																
Frankford																

Table IX

OTHER POLLUTANTS

PROJECT	MBAS mg/l LAS		CHLORIDE mg/l Cl^-		SULFATE $mg/l\ SO_4^{-2}$		CADMIUM mg/l Cd		CHROMIUM mg/l Cr		COPPER mg/l Cu		LEAD mg/l Pb	
	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.
CONVENTIONAL ACTIVATED SLUDGE PLANTS														
Belleville	1.8	.4	76	74	54	50								
Brantford	6.0	2.3												
Burlington D. L.	4.5	.3	93	94	98	100								
Burlington E. G.	7.5	.3	76	71	82	89								
Campbellford	2.0	.3	30	31	30	33								
Coniston	6.4	.7												
Elmira														
Fergus	5.3	.2												
Galt	6.5	1.5												
Georgetown	4.0	.2												
Hagersville	3.4	.8												
Huntsville	4.2	.8												
Ingersoll														
Kingston Twp.	17.	12.	94	76	67	62								
Kitchener	3.7	.3												
Markham	5.6	1.4					<.02	<.02	.03	<.02	.81	.43	.17	.05
Newmarket	6.6	.3			45	51								
North Bay	1.8	.9					.05		.35		13.		5.5	
Orangeville	6.0	.5												
Pickering	10.	.4												
Preston	4.3	1.5					.05	<.02	2.0	.17	6.1	.29	<.12	.1
Richmond Hill	4.3	.3												
St. Mary's														
Sidney Twp. (Batawa)	2.7	.2	25	24	39	38								
Simcoe	.7	.2												
South Peel														
- Clarkson	7.7	1.3	130	160										
- Erindale	5.4	.3	82	63										
- Lakeview	4.7	.8	140	140	110	130	.41	<.01	.44	.04	.96	.10	.28	.05
- Malton	1.0	.8	85	64										
- Streetsville	4.5	.3	72	85										
Sturgeon Falls	3.8	.2												
Waterdown	6.5	.5	120	91	120	110								
Waterloo	2.9	.4												

Table X

OTHER POLLUTANTS

PROJECT	NICKEL mg/l Ni		ZINC mg/l Zn		PHENOL µg/l C_6H_5OH		IRON mg/l Fe		CALCIUM mg/l Ca		MANGANESE mg/l Mn		MERCURY µg/l Hg		ARSENIC mg/l As	
	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.	INF.	EFF.
CONVENTIONAL ACTIVATED SLUDGE PLANTS																
Belleville																
Brantford					86											
Burlington D. L.																
Burlington E. G.																
Campbellford																
Coniston																
Elmira					1140	250										
Fergus																
Galt																
Georgetown																
Hagersville																
Huntsville																
Ingersoll							110	8.8								
Kingston Twp.																
Kitchener																
Markham	.07	<.05	.61	.24							.08	.09				
Newmarket							1.6	2.2								
North Bay	10.		10.								.70					
Orangeville																
Pickering																
Preston			2.8	.70							.21	.10				
Richmond Hill																
St. Mary's																
Sidney Twp. (Batawa)																
Simcoe																
South Peel																
- Clarkson																
- Erindale																
- Lakeview	.66	.24	.98	.42	40	14					.97	.23				
- Malton																
- Streetsville																
Sturgeon Falls																
Waterdown																
Waterloo																

TREATMENT DATA

GRIT REMOVAL

Graph No. 1 displays the annual average quantity of grit removed in cubic feet per million gallons of sewage treated. The plants are grouped according to the type of grit removal facility - channels, aerated grit tanks and Detritors, and are ranked in order of decreasing unit removal. The amount of grit removed is not necessarily indicative of the amount in the raw sewage - low removals may result from inefficient removal facilities or removal prior to the unit (in pumping stations and sewers); high removals may include large amounts of organic matter.

SECONDARY TREATMENT

The parameters normally used to describe the biological process in the aeration tank are summarized in Table XI and XII. It should be noted that the food to micro-organism ratio (F/M) is listed as pounds of BOD_5 per day per pound of mixed liquor suspended solids, since volatile solids were not available for all plants. While this may not be valid for comparison between plants, particulary where phosphorus removal by chemical precipitation is being practised, it is useful for plant control.

CHLORINATION AND DISINFECTION

Chlorination data and the results of bacteriological sampling are shown in Tables XIII and XIV. The average dosage required to maintain an 0.5 mg/l chlorine residual after 15 minutes contact time is 5.4 mg/l for primary treatment plants and 4.3 mg/l for secondary treatment plants. Chlorine used for other purposes such as odor control is not included. A total of 783,000 lbs. of chlorine was used at primary treatment plants, 1,270,000 lbs. in secondary treatment plants. Only Moosonee, an extended aeration plant, used sodium hypochlorite solution for effluent chlorination.

GRAPH no. 1 GRIT REMOVAL

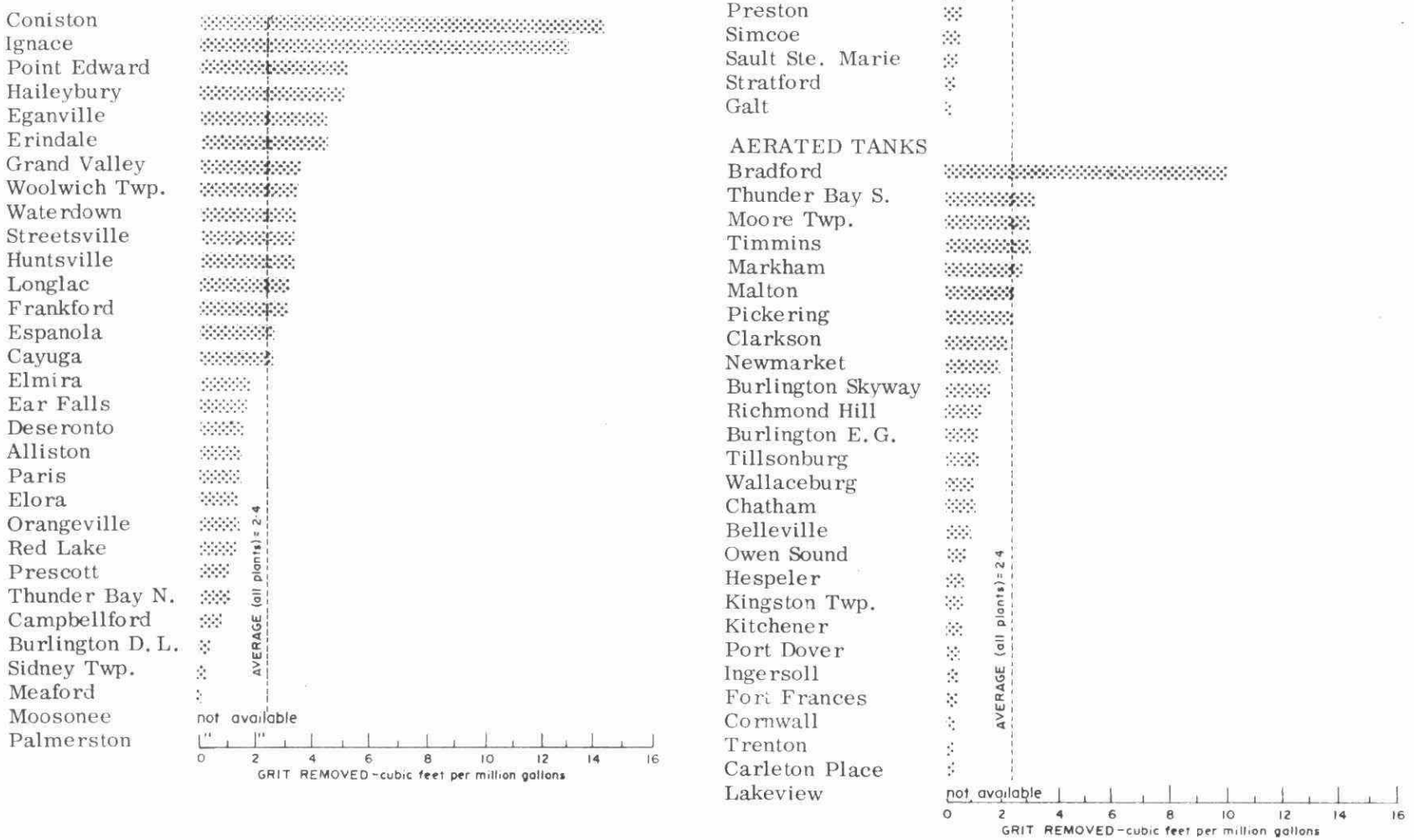


Table XI

AERATION

PROJECT	AERATION BOD mg/l	INFLUENT S.S. mg/l	MLSS CONC. mg/l	F/M lb. BOD/day per lb. MLVSS	AIR SUPPLIED 10^3 ft./lb. BOD removed	WASTE VOLUME 10^3 gal/day	ACTIVATED S.S. CONC. mg/l	SLUDGE VOLATILE S. % of S.S.
EXTENDED AERATION PLANTS								
Alliston	260	170	4100	.06		7.	23000	61
Burlington Skyway	140	240	4900	.08	1.6		11000	58
Cayuga	140	130	5800	.02			8100	
Deseronto	230	250	5400	.03		1	6600	
Eganville	1000	610	5200	.10			6900	
Elora	140	180	3000	.09	2.1		7000	
Grand Valley	130	140						
Ignace	90	85						
Moore Twp (Corunna)	160	160	4900	.05	5.6	2	9500	59
Moosonee	110	240	4300	.04	5.3		7000	54
Paris	150	130	8500	.01			16000	78
Westminster Twp.	160	220	3900	.06	1.8	.4	10000	
Woolwich Twp.	480	500	6700	.07		4		
CONTACT STABILIZATION PLANTS								
Ear Falls	290	300						
Haileybury	130	170	3300	.12	1.8	.1		
Longlac	110	110						
Red Lake	90	130						
HIGH RATE ACTIVATED SLUDGE PLANTS								
Bradford	400	550	3900	.46			13000	67
Carleton Place	33	54	2400	.21	1.9	8	7500	
Hespeler	240	140	2200	.38				
Meaford	85	120	2800	.11			6000	59
Palmerston	50	154	2800	.015		2	6500	
Sudbury	140	160	5500	.23	1.5	23	23000	73

Table XII

AERATION

PROJECT	AERATION BOD mg/l	INFLUENT S.S. mg/l	MLSS CONC. mg/l	F/M lb BOD/day per lb MLVSS	AIR SUPPLIED 10^3 ft./lb BOD removed	WASTE VOLUME 10^3 gal/day	ACTIVATED S.S. CONC mg/l	SLUDGE VOLATILE S. % of T.S
CONVENTIONAL ACTIVATED SLUDGE PLANTS								
Belleville	70	65	2600	.23	2.2	167	8000	67
Brantford	130	110	2400	.33		142		
Burlington D. L.	130	160	2400	.12	1.8	22.	6300	61
Burlington E. G.	120	110	1800	.21	2.3	6	2500	67
Campbellford	30	40	3700	.07		.5	13000	
Chatham	120	150	3000	.13	1.5	39	8200	
Coniston -Old Plant	90	60	3200	.18				
Oxidation Ditch	170	190	6900	.04		.2	14000	52
Elmira	170	90	8600	.03				
Fergus	70	90	2500	.07		3	6900	
Galt	100	74	1800	.19		79	4700	82
Georgetown	110	180	2000	.22			9400	34
Hagersville	90	76	1800	.33				
Huntsville	120	210	2300	.27				
Ingersoll #1	90	110	3400	.07		.7		
#2	80	140	3700	.10	1.3			
Kingston Twp.	200	190	2300	.21	1.6	8	7500	
Kitchener	150	150	2600	.20		158	6700	
Markham	130	170	1400	.27	3.1	8	3800	59
Newmarket	70	110	1700	.16			3500	
North Bay	75	120	1800	.24	3.9	99	9100	73
Orangeville	95	160	3000	.18	6.3	2	23000	
Pickering	90	340	1400	.14			3600	86
Preston	270	140	2700	.29		5	6000	76
Richmond Hill	90	100	1700	.21	3.7		5600	72
St. Mary's	70	45	2400	.06		2		
Sidney Twp. (Batawa)	50	40	2100	.09		.3		
Simcoe #1	170	120	4900	.08	4.3	2		
#2	250	270	4500	.20	4.5	6	14000	70
South Peel								
- Clarkson E	150	130	1200	.89	.9			
W	140	130	1100	.20	1.0			
- Erindale	80	80	1000		3.3			
- Lakeview								
- Malton	120	90	1100		1.8			
- Streetsville	130	120	1200	.21	2.8			
Stratford	70	75	2100	.12	1.6			
Sturgeon Falls	90	70	2400	.37	1.3	6	7000	
Tillsonburg	80	180	2400	.04	3.6	14	6100	
Vanastra	40	30						
Wallaceburg	60	50	1500	.13	7.0	4	5500	53
Waterdown	120	210	1900	.15	9.7		4700	69
Waterloo	190	140	2900	.22	.6	38	7400	67

Table XIII

CHLORINATION and DISINFECTION

PROJECT	CHLORINATION PERIOD (Year-round unless otherwise noted:)	CHLORINE USED 10^3 pounds	AVERAGE DOSAGE mg/l	NUMBER OF EFFLUENT SAMPLES WITH TOTAL COLIFORMS (per 100 ml) OF: less than 4	4 to 32	33 to 320	321 to 3200	3201 to 32000	32001 to 320000	320001 to 3200000	more than 3200000
PRIMARY TREATMENT PLANTS											
Cornwall		228.	5.7	1	1	1	4	2		2	
Espanola	No Chlorination										
Fort Frances		20.5	2.7					2	1	1	1
Midland		42.5	6.9		1	2	3	4		2	2
Owen Sound		44.4	3.0		5	2	2	2	2	4	2
Parry Sound		21.4	6.8								1
Point Edward		8.2	9.7	3	4	2					1
Port Dover	Mar. 26 - Oct. 15	11.5	12.6	3	1			1	2		1
Prescott		17.0	4.6								
Sault Ste. Marie		182.	4.6								
Thunder Bay North	Mar. 28 - Oct. 23	53.2	4.1			4		2			5
Thunder Bay South		79.9	3.7	4	2	2			1		2
Timmins		50.0	3.6	4	2	5	4	2	5		
Trenton		24.2	2.4								
EXTENDED AERATION PLANTS											
Alliston		8.1	5.1		1	1	4	6	3	6	1
Burlington Skyway	May 15 - Oct. 14	40.7	2.2		2	1		1			
Cayuga		2.0	5.6								
Deseronto		1.7	4.2								
Eganville		1.8	5.0								
Elora		1.3	2.4								
Grand Valley		1.0	4.1	2							
Ignace									1	1	
Moore Twp. (Corunna)		3.6	5.7								
Moosonee	July 9 - Nov. 4	288 gal.	6.7								
Paris		1.8	1.5								
Port McNicoll											
Westminster Twp.	May 5 - Nov. 15	1.8	3.4			5	2	6	10		
Woolwich Twp.		6.5	13.9		6	1	2	2			
CONTACT STABILIZATION PLANTS											
Ear Falls											
Haileybury		2.6	2.1								
Longlac		2.1	12.3								
Red Lake		2.3	8.0								
HIGH RATE ACTIVATED SLUDGE PLANTS											
Bradford	June 1 - Nov. 8	3.1	5.5								
Carleton Place		15.7	3.1		1						
Hespeler		EST 22.	4.3								
Meaford		6.6	2.6								
Palmerston											
Sudbury		109.	2.7								
TRICKLING FILTER PLANT											
Frankford		2.3	3.3								

Table XIV

CHLORINATION and DISINFECTION

PROJECT	CHLORINATION PERIOD (Year-round unless otherwise noted)	CHLORINE USED 10^3 pounds	AVERAGE DOSAGE mg/l	NUMBER OF EFFLUENT SAMPLES WITH TOTAL COLIFORMS (per 100 ml) OF: less than 4	4 to 32	33 to 320	321 to 3200	3201 to 32000	32001 to 320000	320001 to 3200000	more than 3200000
CONVENTIONAL ACTIVATED SLUDGE PLANTS											
Belleville		65.2	2.5					3			
Brantford		110.	3.1					4	5	1	
Burlington D. L.	May 23 - Oct. 14	6.3	3.0		1		2		1		
Burlington E. G.	May 25 - Oct. 15	4.0	4.2		1				1	1	
Campbellford		10.6	1.8			1	2	7	1		
Chatham	May 15 - Oct. 25	26.0	3.5								
Coniston	May 2st - Oct. 28	1.8	2.2								
Elmira		3.8	2.1								
Fergus		8.6	3.7								
Galt		84.1	4.3					1	11	17	21
Georgetown		23.4	3.1		4	5	5	2			
Hagersville		3.9	2.8								
Huntsville		5.6	4.0								
Ingersoll		14.4	4.9	3	2	2					
Kingston Twp.		16.7	2.9								
Kitchener		158.	3.1				2	1	3	3	
Markham		14.2	4.0								
Newmarket	May 1 - Nov. 11	16.7	5.5								
North Bay		96. EST	4.3								
Orangeville		16.2	3.8		19	1		1		1	
Pickering		2.5	2.9								
Preston		36.9	4.9								
Richmond Hill		40.0	5.8		4	5	7	5	2	1	
St. Mary's	Apr. 30-Dec. 31	2.8	3.4	14	11	7		1			
Sidney Twp. (Batawa)		2.2	3.7								
Simcoe		26.9	4.8								
South Peel											
- Clarkson		38.6	3.3								
- Erindale		8.9	5.3	1	2	3	2	11	3	2	
- Lakeview											
- Malton		12.7	4.5		8	2	2	7	2	3	
- Streetsville		10.7	5.6	1	4		5	4	5	4	1
Stratford		30.6	2.3					1			
Sturgeon Falls		5.0	3.9								
Tillsonburg		6.7	2.3								
Vanastra					5	3	3	4	3		
Wallaceburg		9.0	5.0	1	1						
Waterdown		6.4	12.4		3	2	3	3			
Waterloo		79.9	3.7								

SLUDGE TREATMENT

Of the 77 plants, 47 employed anaerobic digestion for the stabilization of sludge. Ten plants, including Hagersville, a conventional activated sludge plant, used aerobic digestion . As in the past, little information is available for aerobic digestion. Most of the extended aeration plants disposed of waste activated sludge, either from a holding tank, or directly from the clarifier. Three plants, Port Dover, Sault Ste. Marie and Preston disposed of raw sludge: Sault Ste. Marie and Preston (part of sludge production) dewatering by vacuum filter.

ANAEROBIC SLUDGE DIGESTION

Data on anaerobic sludge digestion are summarized in Tables XV and XVI for single and multi-stage digestion respectively. The gas produced in those plants with functioning meters averaged 15 cubic feet per pound of organic matter destroyed. The gas produced is used largely to heat the digesters to promote rapid decomposition of the sludge.

AEROBIC DIGESTION

The available data on aerobic digestion is summarized in Table XVII. Data is sparse, with sufficient information to calculate volatile solids reduction for only three plants. It would appear that the sludge, being waste activated sludge, can be thickened to no more than about 2.5% total solids.

SLUDGE DEWATERING

Table XVIII summarized data from the two vacuum filter installations still in operation. Both Sault Ste. Marie and Preston dewatered raw sludge. No chemical conditioners were required at Sault Ste. Marie because of the nature of the sludge.

A solid bowl centrifuge was used at Simcoe to dewater anaerobically digested sludge before disposal and also to thicken waste activated sludge prior to anaerobic digestion. No data are available.

A few plants used sludge drying beds to dewater sludge prior to ultimate disposal, though, in most cases, the entire production could not be treated in this fasion. Sludge lagoons were used at Kitchener to reduce the quantity to be hauled and at South Peel, Cornwall, Sudbury and other plants as storage lagoons when access to farms was made impossible by weather.

SLUDGE CHARACTERISTICS

Because it is planned to dispose of the sludge on farmland, where possible, a program was instituted in 1973 to provide data on the value of the various sludges as soil conditioners and on the less desireable components of the sludges such as heavy metals. As it can be seen in Tables XIX and XX there is no "average" value which could be assigned to any of the parameters. These parameters are listed as "parts per million" of the sludge as received, except for total solids (in per cent), volatile solids (in per cent of total solids), pH, sodium and potassium (both in milligrams per gram dry weight basis). Volatile acids content for aerobically digested, waste activated and raw sludges have no relevance to the plant processes but might be taken as an indication of the stability of the sludge under anaerobic conditions (encountered during transit).

In addition to those characteristics listed in Tables XIX and XX some analyses were carried out for selenium. The results are as follows:

Campbellford	0.001 ppm
Huntsville	0.10 ppm
Kingston Twp.	0.02 ppm
Tillsonburg	0.24 ppm
Brantford	0.07 ppm
Stratford	0.18 ppm

Table XV

ANAEROBIC DIGESTION – Single-Stage

PROJECT	DIGESTER VOLUME thousand gallons	RAW SLUDGE VOLUME to DIGESTER million gallons	RAW SLUDGE TOTAL SOLIDS %	RAW SLUDGE VOLATILE SOLIDS % of T.S.	DIGESTED SLUDGE TOTAL SOLIDS %	DIGESTED SLUDGE VOLATILE SOLIDS % of T.S.	VOLATILE SOLIDS REDUCTION %	SLUDGE REMOVED million gallons	SUPERNATANT SUSP. SOLIDS %	GAS PRODⁿ cubic feet per lb VS destroyed
PRIMARY TREATMENT PLANTS										
Espanola	120	.77	1.2	77	1.7	69	34	.003	.1	
Fort Frances	200	.70	3.6	60	6.0	48	38	.14	.1	
Parry Sound	140	.41	4.2	59	8.4	39	56	.11	.8	14
Point Edward	94	.49	5.6	60	7.1	58	8	.34		
Prescott	108	.50	3.7	62	5.5	39	61	.016	.6	3
Thunder Bay North	310	5.4	5.7	64	10.0	71	32	1.4	1.0	
Timmins	500	15.	3.7	68	4.9	59	32	2.1	.2	
SECONDARY TREATMENT PLANTS										
Burlington E.G.	200	.59	4.2	79	2.3	56	66	.59		
Campbellford	110	1.5	4.4	64	5.6	40	63	.28	1.4	11
Clarkson	220	4.8	4.9	63	5.5	53	34	3.6	.7	
Erindale	250	.94	3.0	77	3.2	63	49	1.1	.5	
Fergus	140	.56			3.9	58		.62		
Huntsville	94	.49	4.9	51	4.2	50	2	.53	.8	
Kingston Township	340	1.3	4.5		6.8	28		.15	.1	
Markham Township	220	2.7	4.8	60	3.3	44	48	1.7		
Orangeville	220	1.8	4.8					.68		
Pickering	95	.94	6.5	84	4.4	49	82	.24	.1	
Saint Mary's	165	.16						.069		
Sidney Township	34	.24	1.7	69	3.6			.029	.4	
Streetsville	220	1.4	4.7	64	3.6	48	48	1.1	.6	
Sturgeon Falls		.11	3.6	70						
Tillsonburg	220	2.1	2.8		3.3			.62	.3	
Vanastra	N.A.									
Waterdown	94	.41	3.0	78	2.4	65	48	.25	.9	

Table XVI

ANAEROBIC DIGESTION – Multi-Stage

PROJECT	DIGESTER VOLUME in thousand gallons PRIMARY	DIGESTER VOLUME in thousand gallons SECONDARY	RAW SLUDGE VOLUME to DIG. million gallons	RAW SLUDGE TOTAL SOLIDS %	RAW SLUDGE VOLATILE SOLIDS % of T.S.	PRIMARY DIGESTER TOTAL SOLIDS %	PRIMARY DIGESTER VOLATILE SOLIDS % of T.S.	PRIMARY DIGESTER V.S. REDⁿ %	SEC. DIGESTER TOTAL SOLIDS %	SEC. DIGESTER VOLATILE SOLIDS % of T.S.	OVER-ALL V.S. REDⁿ %	SLUDGE REMOVED million gallons	SUPERNATANT S.S. %	GAS PRODⁿ cubic feet per lb VS destroyed
PRIMARY TREATMENT PLANTS														
Cornwall	480	480	6.3	4.9	59	2.7	45	43	7.0	43	48	2.3	.8	16
Midland	97	95	1.4	7.9	36	4.5	36		8.6	28	31	.62	.6	22
Owen Sound	200	190	3.1	7.4	45	1.8	36	31	8.1	23	64	1.5	.2	
Thunder Bay South	440	440	4.9	4.2	68				13.	41	67	.50	.4	
Trenton	84	84	1.8	6.2	43				11.			.15	.7	
SECONDARY TREATMENT PLANTS														
Belleville	500	370	16.	4.4	59	4.0	54	18	4.8	50	31	4.7	2.9	
Brantford	600	1200	12.	5.6	70	3.7	63	27	3.6	61	33	10.	.3	
Burlington D. L.	310	100	1.4	7.1	61	.7	46	46	5.0	60	5	.7		
Coniston	28	5	.040	3.2	66	1.8			8.0	48	52	.039	.5	
Chatham	530	510	12.	4.6	51	3.6	46	18	4.5	41	33	8.2	1.9	17
Galt	190	480	5.9	3.7	75	2.0	68	29	1.7	65	39	5.0		
Georgetown	485	129	N/A	8.8	43	2.2	46		3.7	55	0	2.1		
Ingersoll			2.2	3.3		.5						.9		
Kitchener	900	2500	24.	5.0	66	3.6	60	23	3.5	56	34	23.	1.4	
Lakeview	1000	1800												
Malton	200	200	2.5	3.4	73				3.4	53	71	.7	.2	
Newmarket	170	180	3.8	9.0	31	13.			13.	26	22	2.8	.5	
North Bay	440	460	7.6	4.0	63	5.2	58	19	4.6	62	4	4.3	.7	
Richmond Hill	250	84	5.0	5.2	75				1.7	61	48	3.1	1.7	
Simcoe	270	270	3.0	4.1	70	3.4	52	54	2.6	53	52	1.1	.5	
Stratford	420	200	2.5	5.8	64				4.0	55	31	2.7		24
Wallaceburg	120	120	.38	8.3	43	1.8	42	4	5.2	40	12	.18		
Waterloo	780	730	10.	5.0	65	2.9	53	39	3.2	52	39	8.4	.4	10

Table XVII

AEROBIC DIGESTION

PROJECT	DIGESTER VOLUME thousand gallons	SLUDGE TO DIGESTER			DIGESTED SLUDGE			VOLATILE SOLIDS REDUCTION %
		VOLUME thousand gallons	TOTAL SOLIDS %	V.S. % of T.S.	VOL. REMOVED thousand gallons	TOTAL SOLIDS %	V.S. % of T.S.	
Bradford	340		1.3	67	410	1.8	60	27
Carleton Place	150	3000	.7		190	.9	62	
Deseronto	67	470	.7		75	2.5	55	
Ear Falls								
Eganville	57		.7		88	.9		
Hagersville								
Haileybury	93	42				1.5	48	
Hespeler	540				150	2.1		
Longlac								
Meaford	227		.6	59	74	.5	55	16
Moosonee	7		.7	54				
Port McNicoll								
Red Lake	68				45			
Sudbury	595	8500	2.3	73	3700	2.4	80	0

Table XVIII

VACUUM FILTRATION

PROJECT	TOTAL FILTER HOURS	SLUDGE TO FILTER(S)			CONDITIONING CHEMICALS						FILTER YIELD lb per ft² per hour	FILTER CAKE	
		VOLUME 10^3 gallons	T.S. %	DRY SOLIDS 10^3 pounds	LIME as CaO		FERRIC CHLORIDE		POLYMER			T.S. %	AMT. HAULED cubic yards
					USED 10^3 pounds	DOSAGE %	USED 10^3 pounds	DOSAGE %	USED pounds	DOSAGE ppm			
RAW PRIMARY SLUDGE													
Sault Ste. Marie	2522	8030	5.8	4660	0		0		0		9.1	24	8855
RAW PRIMARY + WASTE ACTIVATED													
Preston	465	1180	8.0	949	129	13	33	3.5	0		8.8	21	2470

Table XIX

SLUDGE CHARACTERISTICS

NOTE: Units are parts per million as sampled except where noted.

PROJECT	SOLIDS		pH	VOLATILE ACIDS as	NITROGEN as N		P	Na	K	Cl⁻	ALKALINITY	Cr	Al
	TOTAL %	VOLATILE % of T.S.	units	ACETIC ACID	AMMONIA	KJELDAHL		mg/g dry	mg/g dry		as $CaCO_3$		
ANAEROBICALLY DIGESTED SLUDGE													
(a) Primary Treatment Plants													
Espanola	1.7	69		440							380		
Midland	8.6	28	7.1	120	260	1600	2700	2.5	1.0	140	10,000	260	1500
Owen Sound	8.1	23									2700		
Parry Sound	5.9	28			53	2300	480	18	10				
Point Edward	7.1	56	7.1	1100	170	1200	1600	33	11	57	14,000	9	770
Thunder Bay North	9.5	72	4.8	4200	120	1600	290	.70	.83	120	860	5	530
Thunder Bay South	12.	41	7.4	360	330	2300	610	.8	.9	960	5300	45	910
Timmins	4.9	52	6.5	250	66	1300	290	8.4	3.7	160	770		
(b) Secondary Treatment Plants													
Belleville	4.8	50	7.0	< 50	750	1700	700	2.4	2.6	73		27	690
Brantford	3.6	61	7.7	130	560	1800	670	48	35	330	4500	40	480
Burlington D. L.	5.0	60	6.4	1200	310	2300	680	1.2	2.2	110	3900	41	1700
Burlington E. G.	2.1	54	8.2	100	740	1600	480	4.2	4.2	110	3800	1.1	240
Campbellford	4.1	40	7.2	< 50	38	1700	990	.98	2.8	35	4800	2.5	730
Chatham	4.5	41	7.4	320	460	1400	1800	4.1	43	340	7000	140	660
Clarkson	5.5	53				2000	1100						
Erindale	3.2	63				1400	430						
Fergus	3.9	58	7.6	90			700	290	53	1500		180	32
Huntsville	3.7	46	7.3	240	460	1100	770	1.8	2.8	53	3600	3.5	780
Kingston Twp.	5.3	41	6.9	180	330	2700	1200	1.1	4.4	92	1200	8.0	860
Malton	3.4	53			1600	530							
Markham Twp.	3.4	44	7.3	350							9500	4.4	10,000
North Bay	4.6	62	6.3	380	120	160	46	6.3	2.1	69	690		
Orangeville	4.3	39	7.8	220	700	2000	840	2.3	3.3	210	9100	14	860
Pickering	4.4	49		500		270	79						
Simcoe	2.6	53	7.2	150	750	2200	850	62	50	400			
Stratford	4.0	56	7.3	90	530	2200	740	41	34	460	4800	130	1300
Streetsville	3.6	48				2600	510						
Tillsonburg	3.3	48	7.4	80	350	1700	2000	2.0	1.8	190	6000	10	1100
Wallaceburg	5.4	40	7.2	77	780	2400	810	43	28	56	10,000	11	1000
Waterdown	2.4	65	7.2	100	540	1800	350	4.9	3.3	150	3400	1.7	200
Waterloo	3.2	52		95	480	1500	200	130	84	360	5900	9	15
AEROBICALLY DIGESTED SLUDGE													
Haileybury	1.5	48		<50									
Moore Twp.	2.3	55	6.8	640	130	1400	1000	2.8	3.0	260	2200	1.6	150
Sudbury	2.4	80										1.6	120
WASTE ACTIVATED SLUDGE													
Alliston	5.1	71	6.7	360	400	2200	310	5.0	3.6	87	6000	1.5	
Burlington Skyway	2.1	63	6.5	440	66	750	310	4.7	4.1	130	3500	34	630
Elora			7.3	<50	450	1700	590	170	48	17	4000	.50	110
Grand Valley	1.0	28	7.0	55	26	500	140	8.2	5.5	180	900	.35	120
RAW SLUDGE													
Port Dover	8.7	71	6.7	360	400	2200	310	5.0	3.6	87	6000	1.5	
Preston					400	1000	660						

Table X X

SLUDGE CHARACTERISTICS

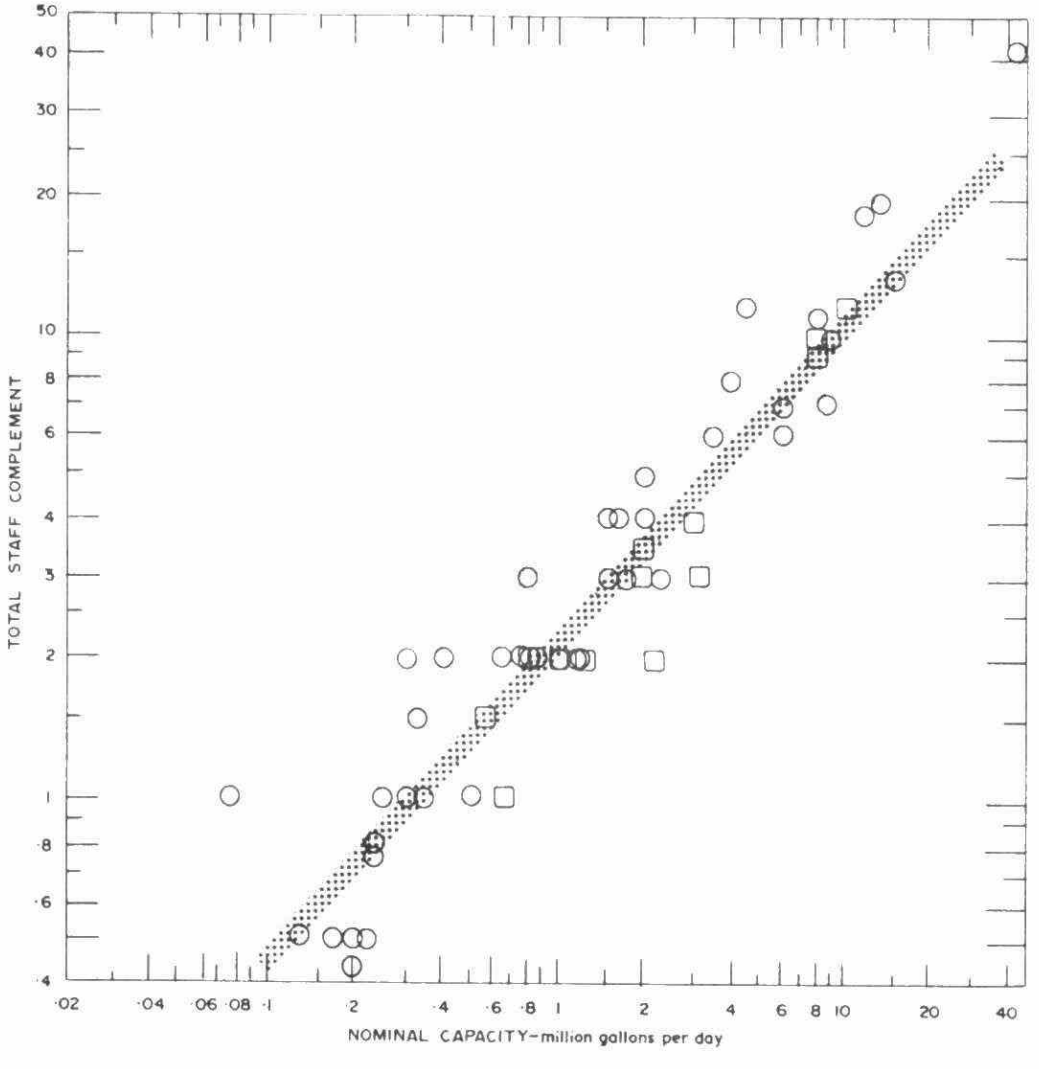
NOTE: Units are parts per million as sampled except where noted.

PROJECT	Zn	Cu	Ni	Pb	Cd	Mn	Fe	Ca	Mg	Co	Hg (ppb)	Mo	Ti	ETHER EXTRACTIBLES
ANAEROBOICALLY DIGESTED SLUDGE														
(a) Primary Treatment Plants														
Espanola														
Midland	76	54	230	47	.78	36	1000	2800	2200	2.3				1100
Owen Sound														
Parry Sound														
Point Edward	42	28	1.8	20	.25	12	2600	1800	3100	.32	21			7200
Thunder Bay North	35	40	2.0	40	.30	14	1200	440	260	.90				6400
Thunder Bay South	35	77	8	40	1.0	60	7300	810	350	2.0				6500
Timmins														2400
(b) Secondary Treatment Plants														
Belleville	23	55	2.8	110	.85	18	1000	2200	160	.75				410
Brantford	61	49	5.9	29	1.7	9.5	1400	1400	250	.5	28	.73	74	940
Burlington D. L.	70	42	3.0	17	2.0	45	1400	4900	1100	1.2				4200
Burlington E. G.	16	18	.50	2.4	.40	4.3	80	680	370	1.				360
Campbellford	15	10	.80	15	.10	45	370	120	1700	.46	24	.2	22	200
Chatham	1.6	7	15	15	.21	8	1300	1700	30	1.5	17	5		1700
Clarkson														
Erindale														
Fergus	450	270	5.0	5	1.5	18	670	2100	16	.03				910
Huntsville	16	11	1.5	9.8	.20	11.	450	480	100	.50	130	.05	68	3200
Kingston Twp.	71	50	3.8	17.	.80	10.	640	2600	380	.65	71	.45	130	2400
Malton														
Markham Twp.	38	93	1.	12	.46	5.0								
North Bay														
Orangeville	31	24	1.3	15	.30	15.	52	3400	450	.35				340
Pickering														
Simcoe														
Stratford	100	39	26	17	.80	12	570	1900	320	.70	54	40	42	1500
Streetsville														
Tillsonburg	36	23	.5	9	15	7.0	290	2300	240	.5	110	1.0	48	590
Wallaceburg	120	46	7.1	21	.50	90	730	4900	670	1.2				1600
Waterdown	32	25	.8	5.7	.38	5.1	180	750	430	.5				320
Waterloo	30	51	3.9	5	.64	8.9	8	590	150					
AEROBICALLY DIGESTED SLUDGE														
Haileybury														
Moore Twp.	30	36	2.2	9.0	.4	20	1200	660	170	.2	260	.6	80	780
Sudbury	9.6	22	5.9	4.8	.2	4.0	180	160	38	.4	30	.3	13	
WASTE ACTIVATED SLUDGE														
Alliston	26	11			.30		720	60	22					640
Burlington Skyway	110	23	4.9	7.4	2.7	14	420	500	280	.33				540
Elora	32	23	.5	13	.2	4.9	1000	1800	380	.5				360
Grand Valley	9	3	.3	1.7	.1	6.5	72	490	110	.3				910
RAW SLUDGE														
Port Dover	4.0	19	.90	12	.60	8.8								
Preston														

PLANT STAFF

During 1973 the 77 water pollution control plants employed a total of 281.95 permanent staff. The fractional complements arise from operation of water projects in the same municipality (see Water Supply 1973 Operating Summary) or employment of part-time staff. Joint operation of water and sewage projects was practised at Espanola, Ear Falls, Eganville, Haileybury, Red Lake, Westminster Twp. and Moosonee. Part-time staff were employed at Grand Valley and Port McNicoll. An operator was shared between Moore Twp. and Point Edward. The operator responsible for Cayuga and Hagersville also operated the waste stabilization ponds at Waterford. The sewage treatment plants at Trenton (primary plant), Batawa (conventional secondary) and Frankford (trickling filter) as well as the water supply at Frankford were operated by the staff of the Trenton WPCP. The three plants in Burlington and the Waterdown WPCP were operated by staff based in Burlington. Elora was operated by staff from Fergus and Hespeler by Preston.

Graph no. 2 shows the relation of staff size to nominal plant capacity for these plants (or group of plants).



GRAPH no. 2 PLANT STAFF

□ Primary Treatment Plants

○ Secondary Treatment Plants

REGRESSION LINE (all plants)

$\log Y = 0{\cdot}352 + 0{\cdot}703 \log X$

$n = 61$ $r = 0{\cdot}95$

Where X = nominal capacity in mgd

Y = total complement

Table XXI

PLANT STAFF

PROJECT	SUPERINTENDENT	ASSISTANT SUPERINTENDENT	CHIEF OPERATOR	FOREMAN	MECHANIC	ELECTRICIAN	LABORATORY TECHNICIAN	OPERATOR	GROUNDSMAN/ JANITOR	TOTAL
PRIMARY TREATMENT PLANTS										
Cornwall	1				2 d			6		9
Espanola			0.5					0.5		1 b
Fort Frances	1							2		3
Midland			1					1		2
Owen Sound			1					2	1	4
Parry Sound			1					1		2
Point Edward			1					0.5		1.5 j
Port Dover	1							1		2
Prescott			1					1		2
Sault Ste Marie	1	1			1			6	1	10
Thunder Bay	1			1 c	1	1		8		12
Timmins			1					2		3
Trenton/Batawa/Frankford			1					2.5		3.5 k
SECONDARY TREATMENT PLANTS										
Alliston			1					1		2
Belleville	1				3		1	5	1	11
Bradford			1					1		2
Brantford	1	1		1	2		1	10	2	18
Burlington/Waterdown	1				2			7		10
Campbellford			1					1		2
Carleton Place			1					1		2
Cayuga			0.45							.45 l
Chatham	1	1			2		1	5	1	11
Coniston								1		1 h
Deseronto			1					1		2
Ear Falls			0.5							0.5 b
Eganville			0.5							0.5 b
Elmira			1					1		2
Fergus/Elora			1					1		2
Galt (Cambridge)	1				1		1	4		7
Georgetown			1		1			1		3
Grand Valley			0.5							0.5 a
Hagersville			0.45							.45 l
Haileybury	0.5							0.5		1 b

PROJECT	SUPERINTENDENT	ASSISTANT SUPERINTENDENT	CHIEF OPERATOR	FOREMAN	MECHANIC	ELECTRICIAN	LABORATORY TECHNICIAN	OPERATOR	GROUNDSMAN/ JANITOR	TOTAL
Huntsville			1							1
Ingersoll			1					2		3
Kingston Twp.			1					2		3
Kitchener	1	1		1	1	1	1	11	2	19
Markham			1					1		2
Meaford			1					1		2
Moore Twp.			1					0.5		1.5 j
Moosonee			0.5					0.5		1 b
Newmarket			1					4		5
North Bay	1				1	1	1	4		8
Orangeville			1					1		2
Paris			1							1
Pickering			1					1		2
Port McNicoll			0.75							0.75 a
Preston/Hespeler	1				2			3		6
Red Lake			0.4					0.4		0.8 b
Richmond Hill			1					3		4
St. Mary's			1					1		2
Simcoe	1		1					2		4
South Peel	1		2		9 g	1	2	23	3	41
Stratford	1	1						4		6
Sturgeon Falls			1					1		2
Sudbury	1				4 e		1	8 f		14
Tillsonburg			1					2		3
Vanastra			1					1		2
Wallaceburg			1					3		4
Waterloo	1				1		1	4		7
Westminster Twp.			1							1
Woolwich Twp.			0.5							0.5 b

a - Part-time operation
b - Jointly operated with water treatment plant
c - Senior operator
d - Maintenance technicians
e - Includes chief of maintenance
f - Includes senior operator
g - Includes chief of maintenance and instrument technician
h - Supervision from Wahnapitae water treatment plant
j - Operator shared between Point Edward and Moore Twp.
k - Trenton, Sidney Twp., Frankford WPCP'S jointly operated with Frankford Water Supply
l - Cayuga, Hagersville WPCP'S and Waterford lagoon are jointly operated

OPERATING COSTS

The operating costs incurred by the 77 water pollution control plants operated by the Ministry of the Environment (including the South Peel System as a single project and the two plants in Thunder Bay as a single project) are summarized in Tables XXII and XXIII. The cost of head office supervision, including travel, accounting, purchasing and inspection, is not charged against the project. A brief explanation of the budget categories used follows:

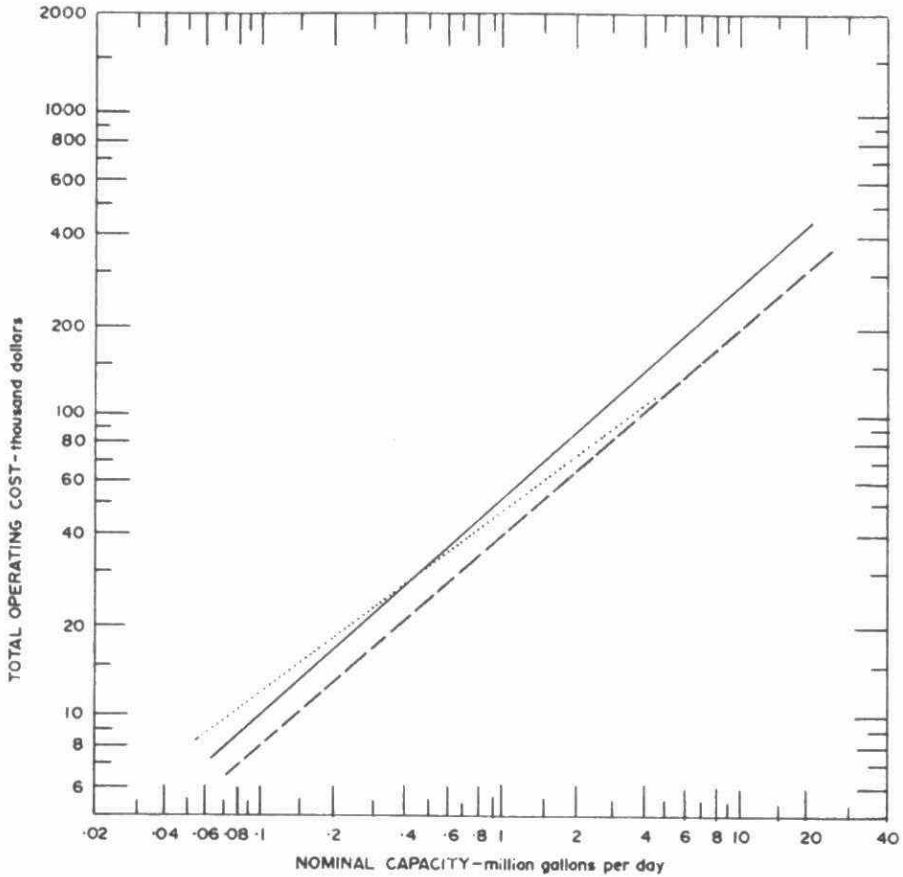
SALARIES & WAGES

Regular & Probationary	includes overtime, call-in, standby, etc.
Unclassified	includes casual, part-time
EMPLOYEE BENEFITS	includes employers share Canada Pension Plan, Superannuation, Unemployment Insurance, Workman's Compensation, etc.
TRANSPORTATION & COMMUNICATION	includes travel, telephone, telemetering, accommodation, etc.
SERVICES	includes easements, insurance, sludge haulage, maintenance and repair, leases.
SUPPLIES & EQUIPMENT	includes new vehicles, chemicals, power, fuel, water, treatment chemicals, small tools, petty cash.

ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	includes new sewer or water connections.
TRANSFER PAYMENTS	includes grants in lieu of taxes (provincial).
OTHER TRANSACTIONS	includes municipal taxes.

Graph no. 3 displays regression lines representing total operating costs for primary treatment plants, modified activated sludge plants (contact stabilization, extended aeration, and high rate plants) and conventional activated sludge plants as functions of nominal capacity. Graph no. 4 shows the relation of unit cost of treatment (in dollars per million gallons) to size of plant.

Tables XXIV and XXV are summaries of unit operating costs and of sludge disposal costs.



GRAPH no. 3 (above) TOTAL OPERATING COSTS

REGRESSION LINE

– – – – Primary Treatment Plants	log Y = 1·605 + 0·693 log X	n = 13, r = 0·95
····· Modified Activated Sludge Plants	log Y = 1·688 + 0·605 log X	n = 24, r = 0·75
——— Conventional Activated Sludge Plants	log Y = 1·726 + 0·733 log X	n = 33, r = 0·86

Where X = nominal capacity in million gallons per day

Y = total annual operating cost in thousands of dollars

GRAPH no. 4 (below) UNIT OPERATING COSTS

REGRESSION LINE

– – – – Primary Treatment Plants	log Y = 2·091 − 0·499 log X	n = 13, r = −0·73
····· Modified Activated Sludge Plants	log Y = 2·282 − 0·468 log X	n = 23, r = −0·61
——— Conventional Activated Sludge Plants	log Y = 2·155 − 0·217 log X	n = 32, r = −0·45

Where X = nominal capacity in million gallons per day

Y = unit operating cost in dollars per million gallons

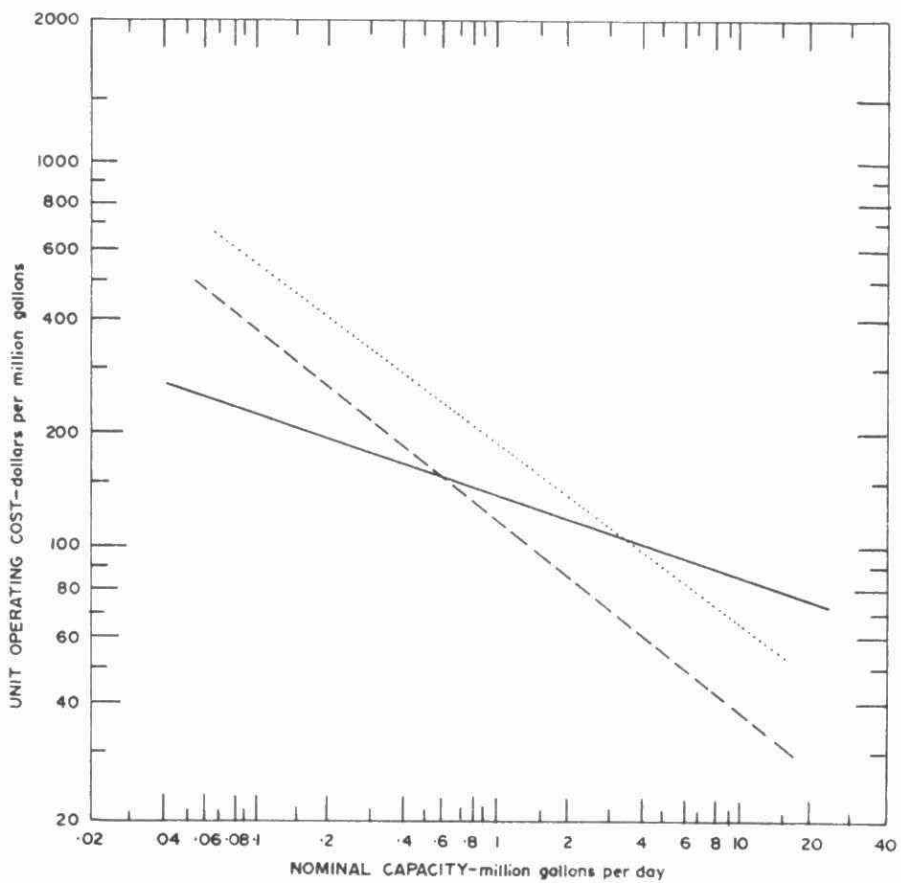


Table XXII

OPERATING EXPENDITURES

NOTE: Units are dollars

Brackets indicate credit

PROJECT	TOTAL EXPENDITURE	SALARIES AND WAGES	EMPLOYEE BENEFITS	TRANSPORTATION AND COMMUNICATIONS	SERVICES	SUPPLIES AND EQUIPMENT	AQUISITION/ CONSTRUCTION OF PHYSICAL ASSETS	TRANSFER PAYMENTS	OTHER TRANSACTIONS
PRIMARY TREATMENT PLANTS									
Cornwall	184, 916	80, 508	4399	2073	28343	44296			25, 297
Espanola	22, 162	13, 395	915	1228	624	6000			
Fort Frances	51, 243	30, 183	1675	821	2381	16183			
Midland	44, 145	22, 971	992	843	7888	11451			
Owen Sound	82, 680	41, 102	2074	983	9366	29155			
Parry Sound	42, 228	21, 596	1192	690	1332	17418			
Point Edward	25, 871	13, 177	711	439	5275	6269			
Port Dover	47, 556	20, 732	1132	427	6847	18434			(16)
Prescott	50, 023	21, 763	1043	733	6789	18117		364	1214
Sault Ste Marie	190, 493	95, 030	5709	2324	18822	57967			10641
Thunder Bay	196, 855	101, 275	5768	2037	17003	70772			
Timmins	82, 101	39, 663	1627	1895	11859	27057			
Trenton	64, 120	33, 926	2366	707	9177	17944			
EXTENDED AERATION PLANTS									
Alliston	36, 316	18, 425	935	1428	4025	11503			
Burlington Skyway	158, 874	64, 855	5445	967	19649	67958			
Cayuga	30, 609	5, 680	59	601	9447	14809			13
Deseronto	35, 564	19, 799	1206	485	3732	5593			4749
Eganville	32, 343	17, 873	870	850	1887	10773			90
Elora	9, 713	2, 006	0	987	474	5614			632
Grand Valley	12, 690	6, 570	104	688	831	4359			138
Ignace	5, 212	0	0	31	1214	3967			
Moore Twp. (Corunna)	33, 153	13, 288	641	734	7594	10896			
Moosonee	26, 604	11, 524	1117	285	987	12691			
Paris	30, 566	12, 450	685	942	5425	11064			
Port McNicoll	6, 326	2, 920	16	304	(30)	3116			
Westminster Twp.	48, 788	18, 183	507	1023	11859	15106	1745		365
Woolwich Twp.	31, 011	13, 729	638	1852	3963	9740		147	942
CONTACT STABILIZATION PLANTS									
Ear Falls	19, 158	11, 966	549	1670	626	4347			
Haileybury	43, 327	20, 262	1304	225	1091	6061		7757	6627
Longlac	14, 401	0	0	75	8898	5428			
Red Lake	23, 455	12, 859	1368	551	1418	5287		1073	899
HIGH RATE ACTIVATED SLUDGE PLANTS									
Bradford	49, 727	18, 991	1101	1324	9883	18428			
Carleton Place	42, 478	22, 986	1240	1241	4234	11547		428	802
Hespeler	57, 233	20, 464	1096	1513	1528	32632			
Meaford	44, 043	21, 124	1087	992	5184	15344		152	160
Palmerston	4, 382	0	0	0	457	3925			
Sudbury	374, 769	142, 549	6713	3476	56202	165829			
TRICKLING FILTER PLANT									
Frankford	10, 112	1, 304	0	374	1823	6369		123	119
TOTAL	2, 265. 247	1, 015, 128	56, 284	37, 818	288, 107	803, 447	1745	10, 044	52, 672

Table XXIII

OPERATING EXPENDITURES

NOTE Units are dollars

Brackets indicate credit

PROJECT	TOTAL EXPENDITURE	SALARIES AND WAGES	EMPLOYEE BENEFITS	TRANSPORTATION AND COMMUNICATIONS	SERVICES	SUPPLIES AND EQUIPMENT	AQUISITION/ CONSTRUCTION OF PHYSICAL ASSETS	TRANSFER PAYMENTS	OTHER TRANSACTIONS
Conventional Activated Sludge Plants									
Belleville	205, 139	104, 521	6684	2176	44045	47698	0	15	0
Brantford	269, 229	163, 693	9265	1798	4866	64263	0	0	25344
Burlington D. L.	38, 002	18, 800	0	216	5371	13615			
Burlington E. G.	26, 132	10, 348	0	207	4019	11558			
Campbellford	48, 859	24, 722	1307	1486	2960	13129		2314	2941
Chatham	264, 380	101, 983	5935	3219	69241	83961			38
Coniston	26, 069	13, 489	643	1343	3401	7093		100	
Elmira	32, 210	20, 590	1222	986	2209	6478	725		
Fergus	35, 681	20, 208	1330	480	3972	9691			
Galt	148, 541	70, 085	4007	1135	30125	42494		695	
Georgetown	87, 987	32, 718	1690	1504	24986	27089			
Hagersville	14, 610	7, 389	85	330	1724	5032			
Huntsville	32, 128	19, 662	615	204	5540	12583		37	2487
Ingersoll	76, 774	29, 709	1765	1595	13454	30250			1
Kingston Twp.	60, 020	30, 445	1722	1135	3028	23690			
Kitchener	411, 770	174, 194	9820	2867	105156	110083			9650
Markham	59, 232	22, 158	1425	633	12808	13208			
Newmarket	116, 640	47, 327	2571	844	20236	41998			3664
North Bay	165, 845	82, 793	4068	3499	28338	43519			3628
Orangeville	42, 379	21, 525	1260	498	7854	11242			
Pickering	36, 149	20, 959	1214	461	3106	9353			1056
Preston	85, 805	36, 647	2422	1006	19793	25937			7229
Richmond Hill	97, 585	45, 505	2576	736	17388	24151			
St. Mary's	45, 802	21, 021	1181	1583	1575	20442			
Sidney Twp. Batawa)	12, 019	5, 763	0	418	474	5364			
Simcoe	90, 947	39, 323	1978	1244	11201	37201			
South Peel	1, 351, 468	444, 649	29016	14402	562850	298955		(318)	1914
Stratford	108, 329	59, 015	3473	2371	22905	20565			
Sturgeon Falls	18, 131	7, 045	353	297	78	9813			545
Tillsonburg	71, 980	28, 623	1422	1422	14746	25767			
Vanastra	Not Available								
Wallaceburg	68, 925	37, 935	2370	1134	5250	16989			5247
Waterdown	15, 399	8, 897	0	288	2037	4177			
Waterloo	169, 299	65, 687	3814	1579	39089	54234			4896
TOTAL	4, 324, 465	1, 828, 428	105, 233	53, 146	1, 093, 828	1, 171, 622	725	2843	68, 640

Table XXIV

OPERATING COST SUMMARY

PROJECT	TOTAL OPERATING COST dollars	UNIT OPERATING COSTS $ per Mil Gal	¢ per lb BOD rem	¢ per lb SS rem	SLUDGE DISPOSAL TOTAL COST in dollars	$ per cu yd	TYPE OF SLUDGE
PRIMARY TREATMENT PLANTS							
Cornwall	184, 916	46	21	6	23, 010	1.50	Liquid, anaerobically digested
Espanola	22, 162	152	20	15	5	1.65	Liquid, anaerobically digested
Fort Frances	51, 243	64	32	11	1, 411	2.80	Liquid, anaerobically digested
Midland	44, 145	73	14	6	5, 234	1.60	Liquid, anaerobically digested
Owen Sound	82, 680	46	18	4	7, 788	.90	Liquid, anaerobically digested
Parry Sound	42, 228	136	22	12	45		
Point Edward	25, 871	307	24	11	3, 435	2.00	Liquid, anaerobically digested
Port Dover	47, 556	248	10	12	457	.58	Liquid, raw
Prescott	50, 023	135	42	14	147	2.50	Liquid, anaerobically digested
Sault Ste. Marie	190, 493	48	10	6	15, 703	2.10	Dewatered, raw
Thunder Bay	196, 855	44	16	8	13, 209	1.25	Liquid, anaerobically digested
Timmins	82, 101	59	8	7	6, 591	.79	Liquid, anaerobically digested
Trenton	64, 120	63	8	7	8, 617	1.75	Liquid, anaerobically digested
EXTENDED AERATION PLANTS							
Alliston	36, 316	235	6	20	3, 450	2.10	Liquid, waste activated
Burlington Skyway	158, 874	46	4	2	13, 595	1.05	Liquid, waste activated
Cayuga	30, 609	867	70	77	1, 051		Liquid, waste activated
Deseronto	35, 564	861	42	33	3, 087	2.10	Liquid, aerobically digested
Eganville	32, 343	924	12	19	1, 404	2.00	Liquid, waste activated
Elora	9, 713	201	13	9	384	1.00	Liquid, waste activated
Grand Valley	12, 690	x 526	59	50			Liquid, waste activated
Ignace	5, 212	145	20	20			Liquid, waste activated
Moore Twp. (Corunna)	33, 153	520	34	34	3, 461	2.00	Liquid, waste activated
Moosonee	26, 604	1512	1.48	77	44		Liquid, aerobically digested
Paris	30, 566	321	21	29	2, 731	1.10	Liquid, waste activated
Port McNicoll	6, 326				0		
Westminster Twp.	48, 788	388	25	18	902		Liquid, waste activated
Woolwich Twp.	31, 011	665	12	19	1, 496	1.00	Liquid, waste activated
CONTACT STABILIZATION PLANTS							
Ear Falls	19, 158	N/A	N/A	N/A	340		Liquid, aerobically digested
Haileybury	43, 327	236	17	18	529	1.65	Liquid, aerobically digested
Longlac	14, 401	+ 857	385	358	1, 417		Liquid, aerobically digested
Red Lake	23, 455	835	112	112	645		Liquid, aerobically digested
HIGH RATE ACTIVATED SLUDGE PLANTS							
Bradford	49, 727	349	9	9	6, 907	1.00	Liquid, aerobically digested
Carleton Place	42, 478	85	63	37	3, 537	3.00	Liquid, aerobically digested
Hespeler	57, 233	116	4	12	812	.80	Liquid, aerobically digested
Meaford	44, 043	174	21	17	642	1.25	Liquid, aerobically digested
Palmerston	4, 382	63	16	5	0		Liquid, waste activated
Sudbury	374, 769	94	6	6	33, 561	1.17½	Liquid, aerobically digested
TRICKLING FILTER PLANT							
Frankford	10, 112	140	50	22	1, 375		Liquid, anaerobically digested

x Plant started Jan. 23
+ Plant started July 31

Table XXV

OPERATING COST SUMMARY

PROJECT	TOTAL OPERATING COST dollars	UNIT OPERATING COSTS			SLUDGE DISPOSAL		
		$ per Mil Gal	¢ per lb BOD rem	¢ per lb SS rem	TOTAL COST in dollars	$ per cu yd	TYPE OF SLUDGE
CONVENTIONAL ACTIVATED SLUDGE PLANTS							
Belleville	205, 139	79	8	4	33, 126	1.20	Liquid, anaerobically digested
Brantford	269, 229	75	5	3.5	9, 717	b	Liquid, anaerobically digested
Burlington D. L.	38, 002	60	4.2	2.1	3, 808	1.05	Liquid, anaerobically digested
Burlington E. G.	26, 132	77	7.3	5.4	2, 927	1.05	Liquid, anaerobically digested
Campbellford	48, 859	59	18	10	1, 047	.90	Liquid, anaerobically digested
Chatham	264, 380	153	9.4	6.5	65, 307	1.00	Liquid, anaerobically digested
Coniston	26, 069	164	10.1	8.8	324	1.17½	Dried anaerobically digested
Elmira	32, 210	17	10	2.3	1, 602	1.00	Liquid, raw
Fergus	35, 681	156	16.6	11.2	2, 921	1.00	Liquid, anaerobically digested
Galt	148, 541	77	6.7	8.1	23, 544	.85	Liquid, anaerobically digested
Georgetown	87, 987	115	10.3	6.5	22, 213	1.10	Liquid, anaerobically digested
Hagersville	14, 610	10	26	13	1, 130	1.50	Liquid aerobically digested
Huntsville	32, 128	228	21	28	4, 221	1.40	Liquid anaerobically digested
Ingersoll	76, 774	EST 263	15	10	10, 422	1.68	Liquid anaerobically digested
Kingston Twp.	60, 020	11	2	8	1, 177	1.52	Liquid anaerobically digested
Kitchener	411, 770	82	4.3	3.4	95, 312	.75 2.20	Liquid anaerobically digested Dewatered, anaerobically digested
Markham	50, 232	140	12.5	9.5	12, 398	1.41	Liquid anaerobically digested
Newmarket	116, 640	180	10.1	5.8	17, 735	1.10	Liquid anaerobically digested
North Bay	165, 845	74	7.1	5.9	22, 580	1.23	Liquid anaerobically digested
Orangeville	42, 379	101	11.2	8.5	6, 740	2.00	Liquid anaerobically digested
Pickering	36, 149	419	7	6	2, 198	2.00	Liquid anaerobically digested
Preston	85, 805	113	2	1.5	16, 042	.80 1.60	Liquid, anaerobically digested Dewatered anaerobically digested
Richmond Hill	97, 585	142	8.4	4.1	16, 299	.96	Liquid, anaerobically digested
St. Mary's	45, 802	397	24	20.1	800		Liquid, anaerobically digested
Sidney Twp. (Batawa)	12, 019	201	20	15	338	1.75	Liquid, anaerobically digested
Simcoe	90, 947	16	7	9	462		Dewatered, anaerobically digested Liquid, anaerobically digested
South Peel - All Plants	1, 351, 468				437, 345	d	Dewatered, anaerobically digested Liquid, anaerobically digested
Stratford	108, 329	83	4.2	3.6	12, 556	1.00	Liquid, anaerobically digested
Sturgeon Falls	18, 131	140 c	21	26		1.10	Liquid, anaerobically digested
Tillsonburg	71, 980	246	21	10	5, 875	1.50	Liquid, anaerobically digested
Vanastra	Not available						
Wallaceburg	68, 925	382	6	47	1, 704	1.50	Liquid, anaerobically digested
Waterdown	15, 399	302	24	14	1, 450	1.10	Liquid, anaerobically digested
Waterloo	169, 299	79	4	4	32, 416	.75	Liquid, anaerobically digested

a - Includes land rental
b - Used plant equipment
c - 122 days flow from Sept. 1st.
d - See text

Waste Stabilization Ponds

Waste stabilization ponds are usually used for the treatment of sewage from smaller municipalities. Only two installations, Alexandria and New Liskeard recorded average flows in excess of 1 million gallons per day. In all probability Gananoque and Lindsay also received flows averaging more than 1 million gallons per day. Flows at most lagoon installations are estimated by pump timers. Those projects for which no flow data are available had variable speed pumping or gravity flow.

The results of sampling are included in Tables XXVI and XXVII along with the flow data. These averages should not be taken as entirely representative since they are usually based on small numbers of grab samples. While effluent concentrations for a particular installation are fairly consistent, influent values vary widely. The apparent reduction in nitrogen concentrations measured as total Kjeldahl nitrogen is partly the result of conversion of organic nitrogen to nitrates and nitrites which are not measured. The nitrogen loading on the receiving stream, particularly in the summer, may be considerably higher than is indicated by total Kjeldahl analysis.

Operating expenditures charged to the projects are summarized in Tables XXVIII and XXIX. In many cases they do not represent the entire cost of operation.

Table XXVI

OPERATING DATA-LAGOONS

PROJECT	FLOW		AVERAGE LOADING	INFLUENT					EFFLUENT				
	TOTAL million gallons	AVERAGE DAY 10^3 gallons	lb BOD per acre per day	NUMBER of SAMPLES	BOD mg/l	SUSP. SOLIDS mg/l	TOTAL P mg/l P	KJELDAHL NITROGEN mg/l N	NUMBER of SAMPLES	BOD mg/l	SUSP. SOLIDS mg/l	TOTAL P mg/l P	KJELDAHL NITROGEN mg/l N
SINGLE CELL INSTALLATIONS													
Black River Twp. (Val Gagne)	not available			6	230	360	8.0	34	6	25	63	3.1	10
Brighton	not available			4	78	69	3.7		4	14	39	2.4	
Chesterville	49.	.14	10	2	110	90	4.6	29	0				
Dutton	6.3	.017	4	9	250	250	8.4	40	4	7	26	1.1	5
Elmvale	a 24.8	.14	40	18	130	180	6.5	35	12	22	30	3.9	13
Emo Twp.	20.7	.057	9	7	160	280	18.	36	3	32	90	4.7	43
Fauquier Twp. (Moonbeam)	23.5	.11	47	11	270	250	9.4	43	11	25	85	5.2	21
Haileybury (N. Cobalt)	9.6	.026	4	11	140	120	8.3	55	11	8	16	2.0	4
Little Current	89.7	.25	8	1	32	160	6.0	11	1	10	10	3.7	3
Lucan	32.5	.089	12	1	70	70	3.4	23	1	12	50	3.0	12
Markdale	not available			2	160	180	9.1	47	2	22	40	7.5	14
Milverton	23.2	.063	26	10	540	360	16.	82	11	39	94	6.6	19
Powassan	47.3	.13	23	11	120	180	7.4	44	11	33	36	3.9	15
Richmond	45.1	.12		0					2	20	60	1.7	5
Rockland	42.8	.12	4	21	67	140	3.1	16	6	10	12	2.9	10
Sutton	87.5	.24	9	6	63	190	3.5	20	6	10	35	.4	14
Waterford	74.8	.21	87	8	640	200	6.5	25	8	36	62	2.6	10
Winchester	43.7	.12	14	21	200	410	7.8	31	1	32	40	.5	18

a - flow from 1st of July

Table XXVII

OPERATING DATA-LAGOONS

PROJECT	FLOW TOTAL million gallons		FLOW AVERAGE DAY mil. gallons	AVERAGE LOADING lb. BOD per acre per day	INFLUENT NUMBER of SAMPLES	INFLUENT BOD mg/l	INFLUENT SUSP SOLIDS mg/l	INFLUENT TOTAL P mg/l P	INFLUENT KJELDAHL NITROGEN mg/l N	EFFLUENT NUMBER of SAMPLES	EFFLUENT BOD mg/l	EFFLUENT SUSP SOLIDS mg/l	EFFLUENT TOTAL P mg/l P	EFFLUENT KJELDAHL NITROGEN mg/l N
MULTI-CELL INSTALLATIONS														
Alexandria	EST	432.	1.4	47	4	140	170	4.3	22	3	70	33	4.3	12
Almonte		240.	.66	130	16	910	420	29.	38	3	65	15	5.9	3
Arthur		58.6	.16	11	10	120	99	6.0	29					
Aylmer	EST	233.	.64	17	9	230	240	13.	28	5	26	36	6.4	11
Beaverton		82.1	.22	5	7	69	140	5.1	16	14	7	17	1.6	3
Beeton		27.0	.074	8	3	160	100	7.0	44	6			6.6	22
Bracebridge		151.	.41	19	10	110	110	7.2	31	9	16	27	3.6	10
Cannington		23.3	.064		0					1	6	45	.3	2
Chesley		70.1	.19	4	2	30	10	3.0	14	2	40	20	1.5	6
Englehart		126.	.35	13	12	78	94	5.8	19	24	11	13	3.0	7
Ernestown Twp.	EST	150.	.41	11	4	100	110	6.1	52	2	19	68	1.7	4
Essex	EST	226.	.62	4	20	34	57	3.1	15	10	11	40	1.4	6
Exeter		160.	.44		0					0				
Forest		27.7	.076	2	5	94	94	5.3	28	13	28	34	.3	2
Gananoque		Not available			12	94	120	4.9	8	12	16	32	3.0	9
Harriston		101.	.28	15	11	160	280	9.5	34	2	11	25	2.8	11
Hearst Twp.		225.	.62	5	2	51	65	5.2	22	2	29	60	5.2	14
Kincardine		172.	.47	14	5	97	130	5.7	28	5	13	25	3.6	9
Lakefield	a	28.8	.12		0					0				
Lindsay		Not available			13	100	140	8.8	37	13	12	30	4.5	12
Madoc	b	63.6	.21	2	2	28	45	4.1	11	16	1	3	.4	2
Mattawa		54.9	.15	5	9	64	60	3.6	17	9	18	27	1.8	7
Michipicoten Twp. (Wawa)		Not available			1	75	120	6.3	22	0				
Mitchell		Not Available												
Neelon & Garson	c	33.0	.37	32	3	250	590	12	33	3	16	28	1.5	8
New Hamburg		59.4	.16	31	24	540	340	17.2	62	22	29	55	5.3	15
New Liskeard		438.	1.2	15	12	55	140	4.0	28	33	18	27	2.8	8
Petrolia		Not available			12	97	210	5.6	22	12	11	18	2.2	5
Port Perry		90.0	.25	12	11	210	210	13.0	33	28	20	20	2.6	4
Port Rowan		9.1	.025	2	6	200	140	12.	47	6	11	32	1.7	1.1
Port Stanley	EST	28.0	.078		0					0				
Ridgetown	d	6.2	.034	1	1	150	120	6.5	47	0				
Seaforth		47.3	.13	2	33	74	80	7.2	29	33	14	33	2.1	15
Shelburne		106.	.29		0					0				
Stayner		27.7	.076	3	3	72	110	6.4	19	5	25	50	2.3	8
Stirling	EST	74.1	.20	24	5	150	140	8.7	24	5	29	35	4.8	14
Tavistock		65.0	.18	17	12	290	220	12.	54	0				
West Lorne		27.3	.075	6	9	130	53	5.0	36	16	9	61	.5	3
Wiarton		Not Available			12	200	110	4.6	17	12	17	40	2.3	5
Wingham		142.	.39	7	12	52	54	3.2	19	12	12	29	2.0	7

a - from 1st of May
b - from March (10 months
c - 3 monthsonly Jan - March
d - from avg.184 days

Table XXVIII

OPERATING EXPENDITURES–LAGOONS

NOTE Units are dollars

Brackets indicate credit

PROJECT	TOTAL EXPENDITURE	SALARIES AND WAGES	EMPLOYEE BENEFITS	TRANSPORTATION AND COMMUNICATIONS	SERVICES	SUPPLIES AND EQUIPMENT	AQUISITION/ CONSTRUCTION OF PHYSICAL ASSETS	TRANSFER PAYMENTS	OTHER TRANSACTIONS
SINGLE CELL PROJECTS									
Black River Twp. (Ramore)	294				19	274			
Black River Twp. (Val Gagne)	6				6				
Brighton	2738	55	0	7	1	2579			96
Chesterville	18896	9466	641	10	5516	3064	0	63	136
Dutton	4639	2373	28	10	224	649	0	0	1355
Elmvale	2630				2630				
Emo Twp.	3626	0	28	223	1084	2291			
Fauquier Twp. (Moonbeam)	1616	820	6	0	1	789			
Haileybury (N. Cobalt)	3644	2220	105	20	455	844			
Little Current	1039				23	1016			
Lucan	125				1				124
Markdale	11				11				
Milverton	3038	1690	13	25	278	400			632
Powassan	559				1	558			
Richmond Village	5340	2386	22	0	1074	1391		186	281
Rockland	5322	2275	49	515	285	2198			
Sutton	1625				162	1463			
Waterford	16				16				
Winchester	17087	8956	620	7	5713	1784			7

Table XXIX

OPERATING EXPENDITURES - LAGOONS

NOTE: Units are dollars

Brackets indicate credit

PROJECT	TOTAL EXPENDITURE	SALARIES AND WAGES	EMPLOYEE BENEFITS	TRANSPORTATION AND COMMUNICATIONS	SERVICES	SUPPLIES AND EQUIPMENT	AQUISITION/ CONSTRUCTION OF PHYSICAL ASSETS	TRANSFER PAYMENTS	OTHER TRANSACTIONS
MULTI CELL									
Alexandria	1773				11	1762			
Almonte	11100	3188	35	118	3700	4059			
Arthur	3186	2178	21	56	228	703			
Aylmer	8753	0	0	20	3973	4163			597
Beaverton	5790	1926	15	166	2121	1240			322
Beeton	2603	1342	0	535	201	525			
Bracebridge	517				874	(357)			
Cannington	2280	1737	16	13	76	364			80
Chesley	816				196	620			
Englehart	715				11	704			
Ernestown Twp.	3739	328	6	16	1071	2318			
Essex	7826	2281	48	484	1456	1911		117	1529
Exeter	1993	36	0	17	20	1827			93
Forest	6309	4097	56	10	745	1401			
Gananoque	13630				2573	11057			
Harriston	659				68	591			
Hearst Twp.	2188				29	2159			
Kincardine	6525				3802	2723			
Lakefield	9179	3763	73	279	3350	1586		58	70
Lindsay	259				51	208			
Madoc	1633	1281	10	50	78	195		11	8
Mattawa	1004				1	1003			
Michipicoten Twp. (Wawa)	214				161	53			
Mitchell	3949	1845	12	33	55	1817			
Neelon & Garson	9119				7695	1424			
New Hamburg	2902			92	553	2130		10	117
New Liskeard	23				1	22			
Petrolia	5668			40	2655	2973			
Port Perry	17463	3384	37	90	10323	3016	0	363	250
Port Rowan	4110	1990	21	21	346	1599			133
Port Stanley	32551	5418	0	257	16147	9752			977
Ridgetown	4188	2048	24		972	1144			
Seaforth	3574	1875	23	71	76	1529			
Shelburne	1096				905	191			
Stayner	211				65	81		65	
Stirling	5546				3646	1885			15
Tavistock	1				1				
West Lorne	5578	3380	43	136	1346	673			
Wiarton	6011	2202	24	97	170	2931			587
Wingham	1733			64	386	1283			

Miscellaneous Projects

Flow data and the results of chemical analyses of the sewages are summarized in Table XXX. Only one of these projects will be operated in its present form in the future; the septic tank in Bancroft is being replaced by a modified activated sludge plant and the addition of a clarifier will convert the aerated lagoon at Durham to an extended aeration plant. The project at Listowel will remain an aerated lagoon in series with facultative stabilization ponds and provision for seasonal spray irrigation.

Operating expenditures charged to these projects are shown in Table XXXI.

Table XXX

OPERATING DATA-MISCELLANEOUS

PROJECT	FLOW		RAW SEWAGE					TREATED EFFLUENT				
	TOTAL million gallons	AVG DAY M G	No of SAMPLES	BOD mg/l	S S mg/l	TOTAL P mg/l P	KJELDAHL NITROGEN mg/l N	No of SAMPLES	BOD mg/l	S S mg/l	TOTAL P mg/l P	KJELDAHL NITROGEN mg/l N
Bancroft	27.8	.076	9	100	160	6.6	25	9	33	38	2.8	13
Durham	75.8	.21	0					0				
Listowell	380.	1.0	42	310	180	4.5	23	93	31	30	2.2	11

Table XXXI

OPERATING EXPENDITURES-MISCELLANEOUS

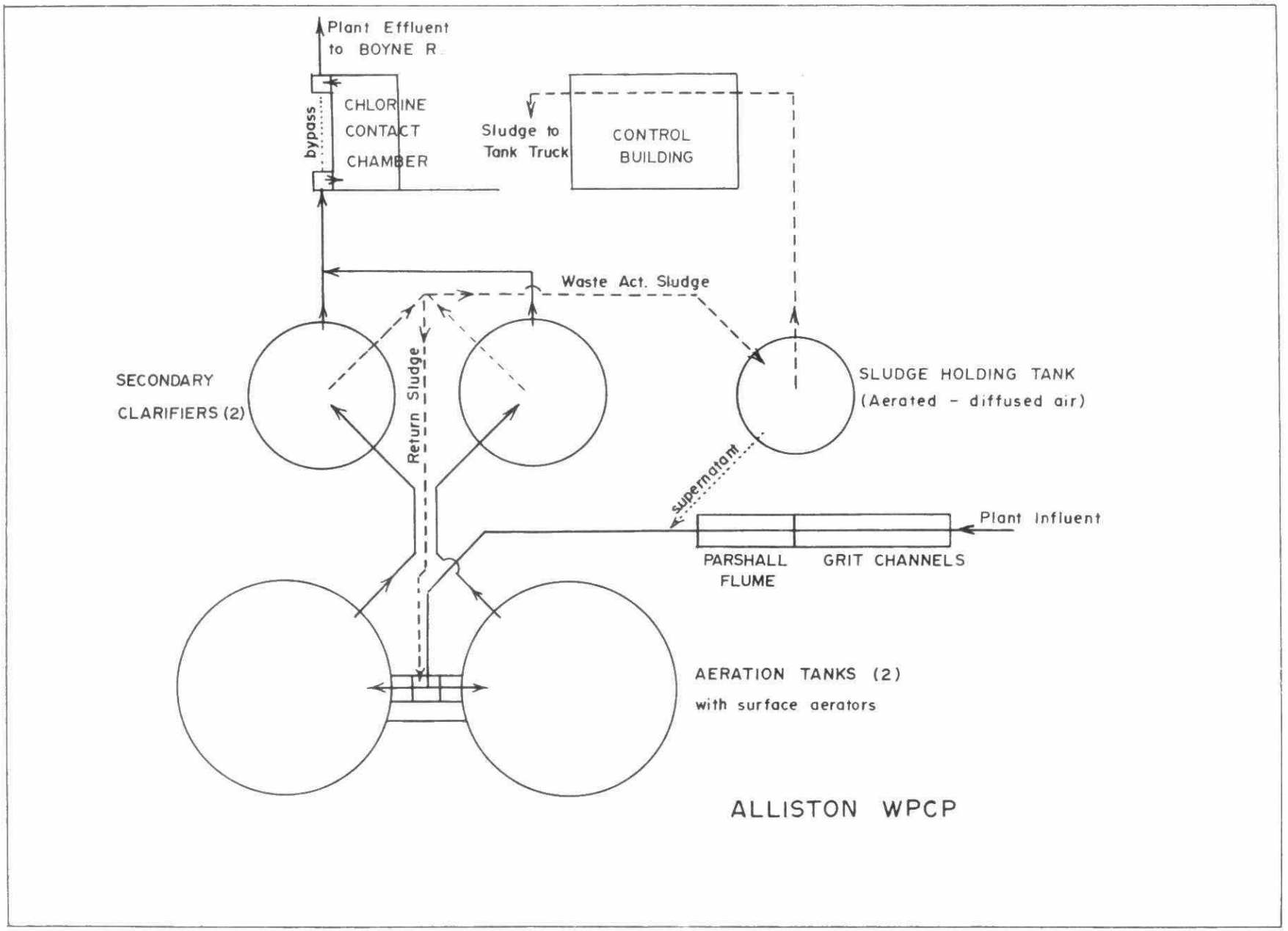
NOTE Units are dollars

Brackets indicate credit

PROJECT	TOTAL EXPENDITURE	SALARIES AND WAGES	EMPLOYEE BENEFITS	TRANSPORTATION AND COMMUNICATIONS	SERVICES	SUPPLIES AND EQUIPMENT	AQUISITION/ CONSTRUCTION OF PHYSICAL ASSETS	TRANSFER PAYMENTS	OTHER TRANSACTIONS
Bancroft	291				1	290			
Durham	6962				4663	2299			
Listowell	57133	5212	71	305	9467	15837	26000		241

APPENDIX

DESIGN DATA


Plant Effluent
to BOYNE R.
bypass
CHLORINE
CONTACT
CHAMBER
Sludge to
Tank Truck
CONTROL
BUILDING
Waste Act. Sludge
SECONDARY
CLARIFIERS (2)
Return Sludge
SLUDGE HOLDING TANK
(Aerated - diffused air)
supernatant
Plant Influent
PARSHALL
FLUME
GRIT CHANNELS
AERATION TANKS (2)
with surface aerators
ALLISTON WPCP

DESIGN DATA

PROJECT NO. 1-0074-67
Design Capacity 0.86 MGD
Design BOD 155 mg/l

PRETREATMENT

GRIT CHANNELS:

Two, each 2.5' x 25.0' x 2.5' swd
Detn: 1.6 min at Des. MGD

COMMINUTOR:

SALA 15" 37.5 Rpm powered by
3/4 HP motor

BAR SCREEN:

in one Grit channel

BIOLOGICAL TREATMENT

AERATION TANKS:

Two, 58.0' dia. x 14.0' swd
Volume: (total) 461.800 I. gal. Detn: 12.9 hr.
Aerators: Two AMES-CROSTA type - 60
with 25 HP motor.

SECONDARY CLARIFIERS:

35.0' dia x 10.0' swd
Volume (total) 124, 800 I. gal. Detn: 3.5 hr.
Overflow rate 450 gpd 1 ft^2.

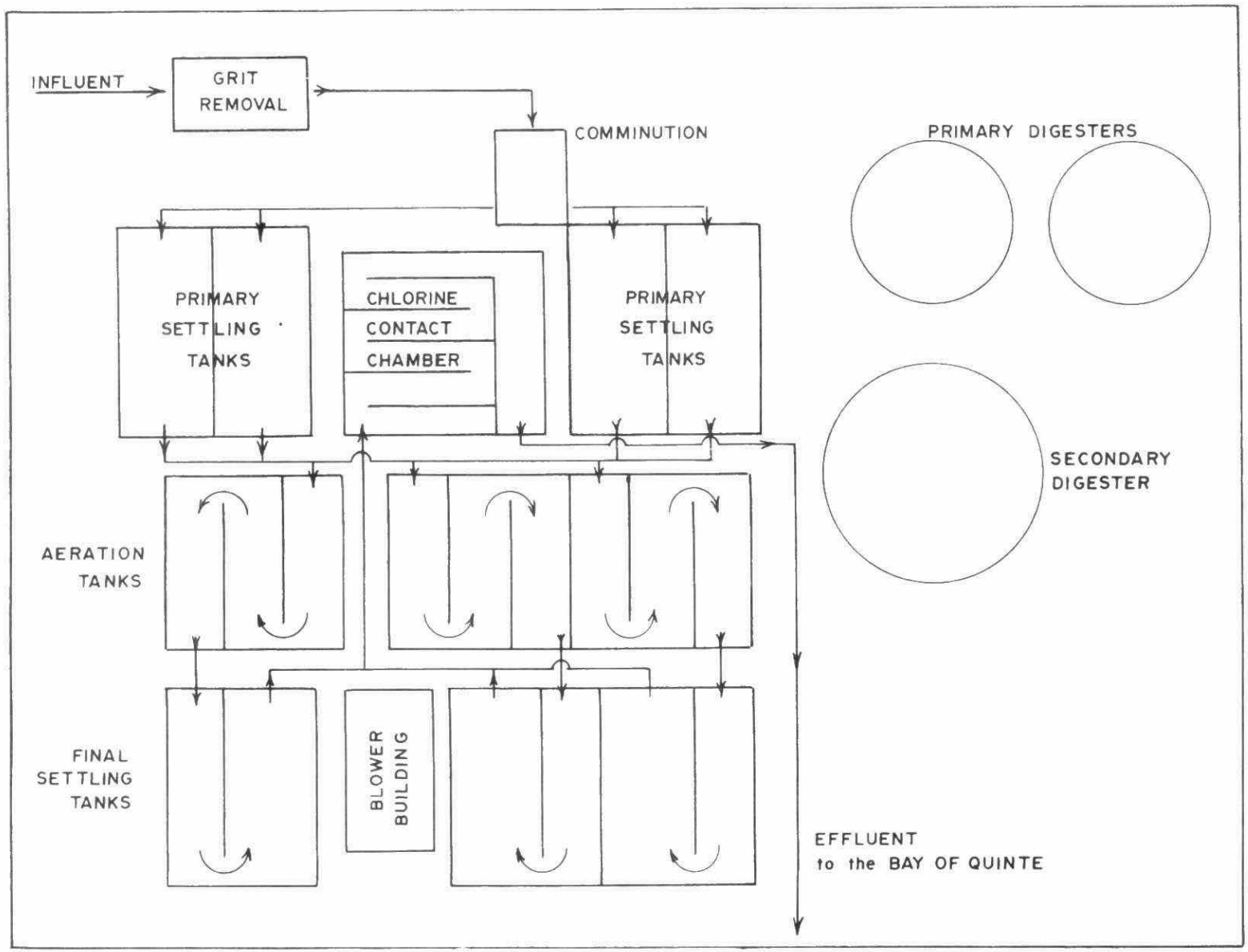
CHLORINE CONTACT CHAMBER:

5 passes, each pass 3.6' x 15.0' x 6.75' swd
Volume (total) 11370 I. gal. Detn: 19 min.
Chlorinator: W & T model A-741

SLUDGE DISPOSAL

SLUDGE HOLDING TANK:

16.0' dia. x 16.0' swd
Volume 21, 200 I. gal.
Sludge pump: CARTER Series 800 plunger
75 USGPM at 60' TDH powered by 3 HP motor.
Blower: SUTORBILT Mod. 3HV13


INFLUENT
GRIT REMOVAL
COMMINUTION
PRIMARY DIGESTERS
PRIMARY SETTLING TANKS
CHLORINE CONTACT CHAMBER
PRIMARY SETTLING TANKS
SECONDARY DIGESTER
AERATION TANKS
FINAL SETTLING TANKS
BLOWER BUILDING
EFFLUENT to the BAY OF QUINTE

PROJECT NO.	1-0004-66
TREATMENT	Activated Sludge
DESIGN FLOW	8.0 mgd
DESIGN POPULATION	52,000
BOD - Raw Sewage	130 mg/l
- Removal	88%
SS - Raw Sewage	175 mg/l
- Removal	91%

PRIMARY TREATMENT

Grit Removal

Type: Aerated grit tank with grab bucket
Size: Two 24' x 24' x 12½'
(52,400 gal)
Retention: 9.4 minutes
Air Supply: Two Roots blowers 610 scfm each
Two Aerzener Rotary 350 scfm each

Screening

Type: Mechanically cleaned
Size: 2" opening

Comminution

Type: Two Chicago Pump barminutor Model C-36

Primary Sedimentation

Type: Falk
Size: Four 70' x 36' x 12'
(752,000 gal total)
Retention: 2.3 hours
Loading: Surface; 795 gal/ft^2/day
Weir; 14,700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, three pass
Size: Three 60' x 20' x 12' of 3 passes
(809,000 gal total)
Retention: 2.4 hours

Air Supply

Type: Aerzen Maschinen fabric
Size: Three 2280 scfm @ 7 psi

Diffusers

Type: Sparjers - 5/16"
Spacing: 4 inch centers

Secondary Sedimentation

Type: Falk
Size: Three 83' x 56.5' x 12'
(2 pass)
(1,070,000 gal total)
Retention: 3 hours
Loading: Surface 800 gal/ft^2/day
Weir 13,000 gal/ft/day

CHLORINATION

Type: Fischer & Porter
Size: One 1,000 lb/day
One 1,500 lb/day

Chlorine Contact Chamber

Size: 54.7' x 60' x 11' (167,000 gal)
Retention: 30 minutes

Outfall

Approx. 280' of 48" dia. concrete pipe and 1179' of 36" dia. concrete pipe to Bay of Quinte

SLUDGE HANDLING

Digestion System

Type: Two stage

Primary:
Type: Gas mixed
Size: Two 45' dia. x 27' swd
(79,400 ft^3 total)

Secondary:
Type: Non mixed
Size: One 55' dia. x 27' swd
(59,400 ft^3 total)

PUMPING STATIONS

a) Plant site @ 35' tdh

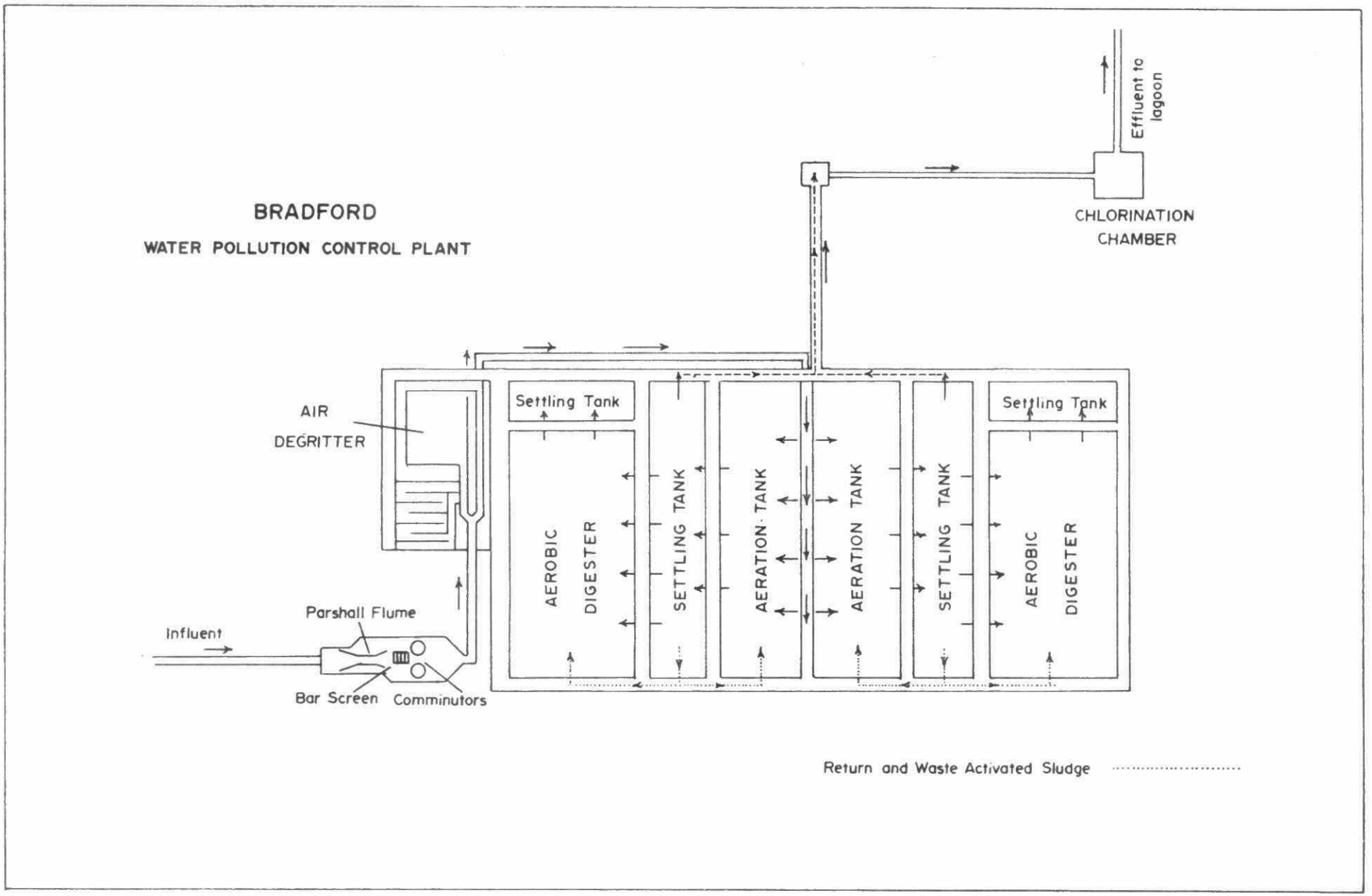
One Worthington 2500 gpm (electric)
One Worthington 1666 gpm (electric)
One Worthington 2500 gpm (electric and diesel)

b) Front Street

One Worthington 2500 gpm (electric @ 55' tdh)
One Worthington 1666 gpm (electric @ 55' tdh)
One Worthington 3332 gpm (diesel and electric @ 55' tdh)
One Fairbanks Morse 4400 gpm (diesel @ 42' tdh)

c) Dundas Street West

One Worthington 416 gpm (electric @ 29' tdh)
One Worthington 1300 gpm (diesel @ 40' tdh)


BRADFORD
WATER POLLUTION CONTROL PLANT
Effluent to lagoon
CHLORINATION CHAMBER
AIR
DEGRITTER
Settling Tank
Settling Tank
AEROBIC DIGESTER
SETTLING TANK
AERATION TANK
AERATION TANK
SETTLING TANK
AEROBIC DIGESTER
Parshall Flume
Influent
Bar Screen
Comminutors
Return and Waste Activated Sludge

DESIGN DATA

Project No:	1-0035-66
Treatment:	High Rate Activated Sludge
Design Flow:	0.86 MGD
BOD:	Raw Sewage - 230 mg/l
SS:	Raw Sewage - 275 mg/l

PRETREATMENT

COMMINUTION CHAMBER:
Two channels 1.9'w x 6.5' x 1.5 (avg)
with comminutors

BAR SCREEN:
In channel between comminutors

AIR DEGRITTER:
9.75' x 13' x 9.6' (avg)
Volume: 7,600 I. gal.
Detention: 13 min.

BIOLOGICAL TREATMENT

AERATION TANKS:
Two, 17.5' x 62' x 12.75' swd
Volume: 173,000 I. Gal.
Detention: 4.8 hours

SETTLING TANKS:
Two, 14' x 62' x 12.75' (avg)
Volume: 106,000 I. Gal.
Detention: 3.0 hour
Overflow rate: 495 gpd/sq. ft.

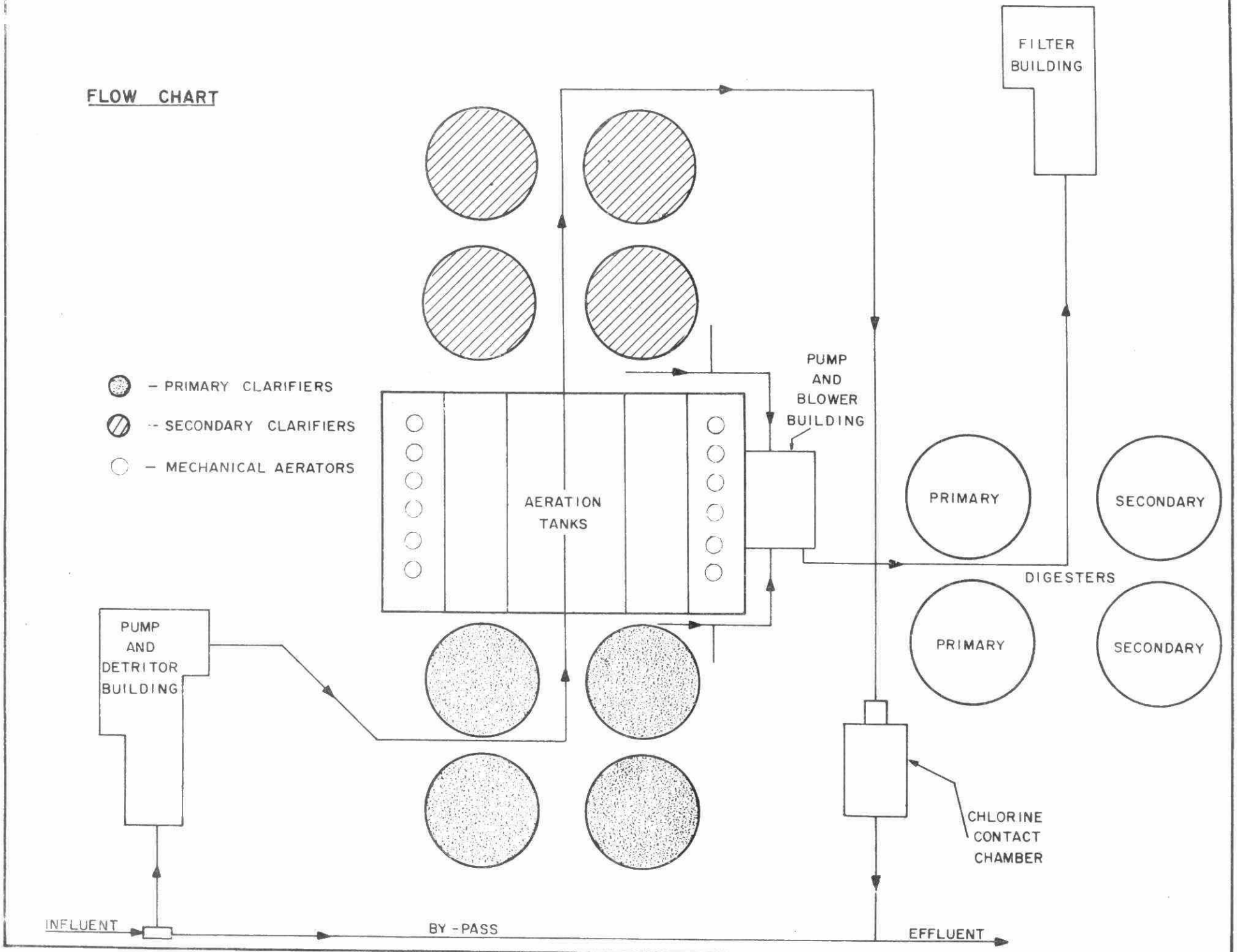
AEROBIC DIGESTERS:
Two, 50' x 32' x 17.5'
Volume: 350,000 I. Gal.

DIGESTER SETTLING TANKS:
Two, 9' x 32' x 9.1'
Volume: 25,000 I. Gal.

BLOWERS:
Three, Type: Roots Connersville
Size: 2650 cfm at 8.5 psi

CHLORINATION:
in manhole

LAGOON
10 acres


FLOW CHART
FILTER BUILDING
– PRIMARY CLARIFIERS
– SECONDARY CLARIFIERS
– MECHANICAL AERATORS
PUMP AND BLOWER BUILDING
AERATION TANKS
PRIMARY
SECONDARY
DIGESTERS
PRIMARY
SECONDARY
PUMP AND DETRITOR BUILDING
CHLORINE CONTACT CHAMBER
INFLUENT
BY-PASS
EFFLUENT

DESIGN DATA

PROJECT NO.	2-0011-58
TREATMENT	Activated Sludge
DESIGN FLOW	12.5 mgd
DESIGN POPULATION	65,000
BOD - Raw Sewage	170 mg/l
- Removal	90%
SS - Raw Sewage	175 mg/l
- Removal	90%

PRIMARY TREATMENT

Screening

Type: Coarse bar screens
Size: Two 5 in. spaces

Comminution

Type: Infilco Rotogrator
Size: Two No. 43 (8 mgd ea)

Raw Sewage Pumps

Type: Fairbanks-Morse
Size: Four 3840 gpm ea @ 45' tdh

Grit Removal

Type: Dorr Detritor, Type WA
Size: Two 20' x 20' x 1'-3"
Flow Velocity: 1 fps
Retention: 0.725 min

Primary Sedimentation

Type: Eimco, Type C
Size: Four 70' dia x 10' swd
Retention: 2 hours
Loading: Surface, 812 gal/ft^2/day
Weir, 14,200 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Two triple-pass tanks ACM mech aerators in first pass; Diffused air in 2nd and 3rd passes.

Size of pass, 200' x 30' x 15'
Retention: 7.5 hr

Air Supply

Type: Sutorbilt blowers
Size: Three 4300 cfm

Secondary Sedimentation

Type: Eimco, Type C
Size: Four 70' dia x 10' swd
Retention: 2 hr
Loading: Surface, 812 gal/ft^2/day
Weir, 14,200 gal/ft/day

CHLORINATION

Chlorinator

Type: Fischer & Porter Manual adjustment - liquid chlorine evaporator

Chlorine Contact Chamber

Size: 51' x 18' x 7'
Retention: 5 min

OUTFALL

Grand River

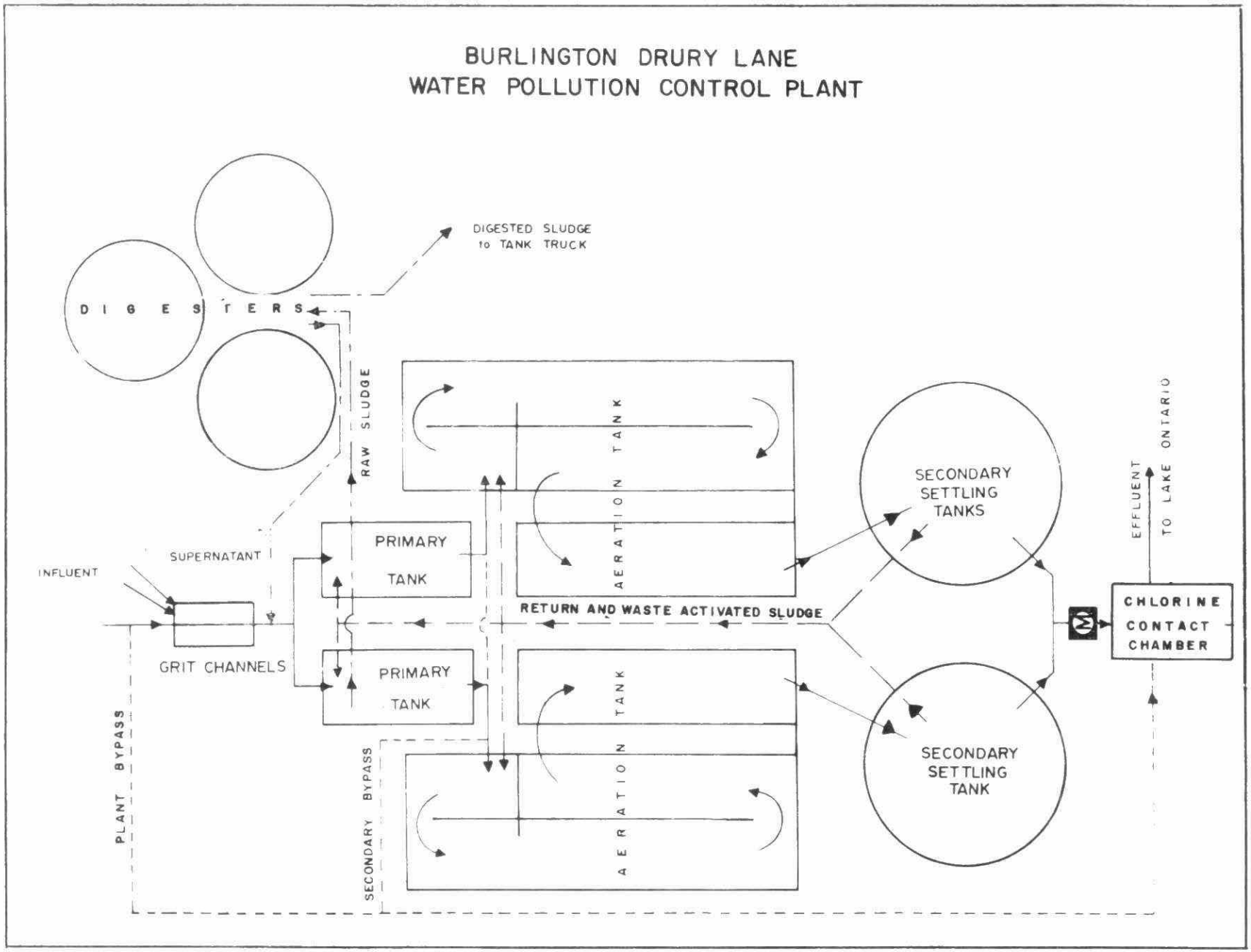
SLUDGE HANDLING

Digestion System

Type: Two-stage
Primary: Two 55' dia tanks with two D-O-L mixers each
Volume 49,300 cu ft or 300,000 gal (each tank)
Loading 6.1 lb/ft^3/mo
Secondary: Two 70' dia tanks with Dorr floating covers
Volume 97,200 cu ft or 600,000 gal (each tank)
Total Loading: 2.0 lb/ft^3/mo

Vacuum Filter

Type: Komline-Sanderson coil filters
Size: Two 350 sq ft filters


BURLINGTON DRURY LANE
WATER POLLUTION CONTROL PLANT
DIGESTED SLUDGE
to TANK TRUCK
DIGESTERS
RAW SLUDGE
AERATION TANK
SECONDARY
SETTLING
TANKS
EFFLUENT
TO LAKE ONTARIO
SUPERNATANT
INFLUENT
PRIMARY
TANK
RETURN AND WASTE ACTIVATED SLUDGE
CHLORINE
CONTACT
CHAMBER
GRIT CHANNELS
PRIMARY
TANK
AERATION TANK
SECONDARY
SETTLING
TANK
PLANT BYPASS
SECONDARY BYPASS
AERATION TANK

DESIGN DATA

PROJECT NO.	2-0051-60
TREATMENT	Activated Sludge
DESIGN FLOW	2.5 mgd
DESIGN POPULATION	30,000
BOD - Raw Sewage	200 mg/l
- Removal	90%
SS - Raw Sewage	180 mg/l
- Removal	90%

PRIMARY TREATMENT

Screening

1" bar screens

Grit Removal

Type: Grit channels
Retention: 0.8 min

Primary Sedimentation

Type: Walker Process
Size: Two 49.3' x 18' x 12.25' (135,700 gal)
Retention: 1.3 hr
Loading: Surface, 1400 gal/ft^2/day
Weir, 17,100 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; triple-pass
Size: Two tanks, each with
2 passes 118' x 18' x 10.7'
1 pass 85.5' x 18' x 10.7'
(833,000 gal. total)
Retention: 8.0 hours

Air Supply

One Sutorbilt - 1500 cfm
Two Roots-Connerville - 750 cfm

Diffusers - (each tank)

1) 132 Schumacher Brandel tubes in first two passes

2) 41 Spargers on 2' centres in third pass

Secondary Sedimentation

Type: Rex Unitube Tow-Bro
Size: Two 50' dia x 10.6' swd (260,000 gal)
Retention: 2.5 hr
Loading: Surface, 1000 gal/ft^2/day
Weir, 8500 gal/ft/day

CHLORINATION

Type: Kent

Chlorine Contact Chamber

- in outfall

OUTFALL

- to Lake Ontario

SLUDGE HANDLING

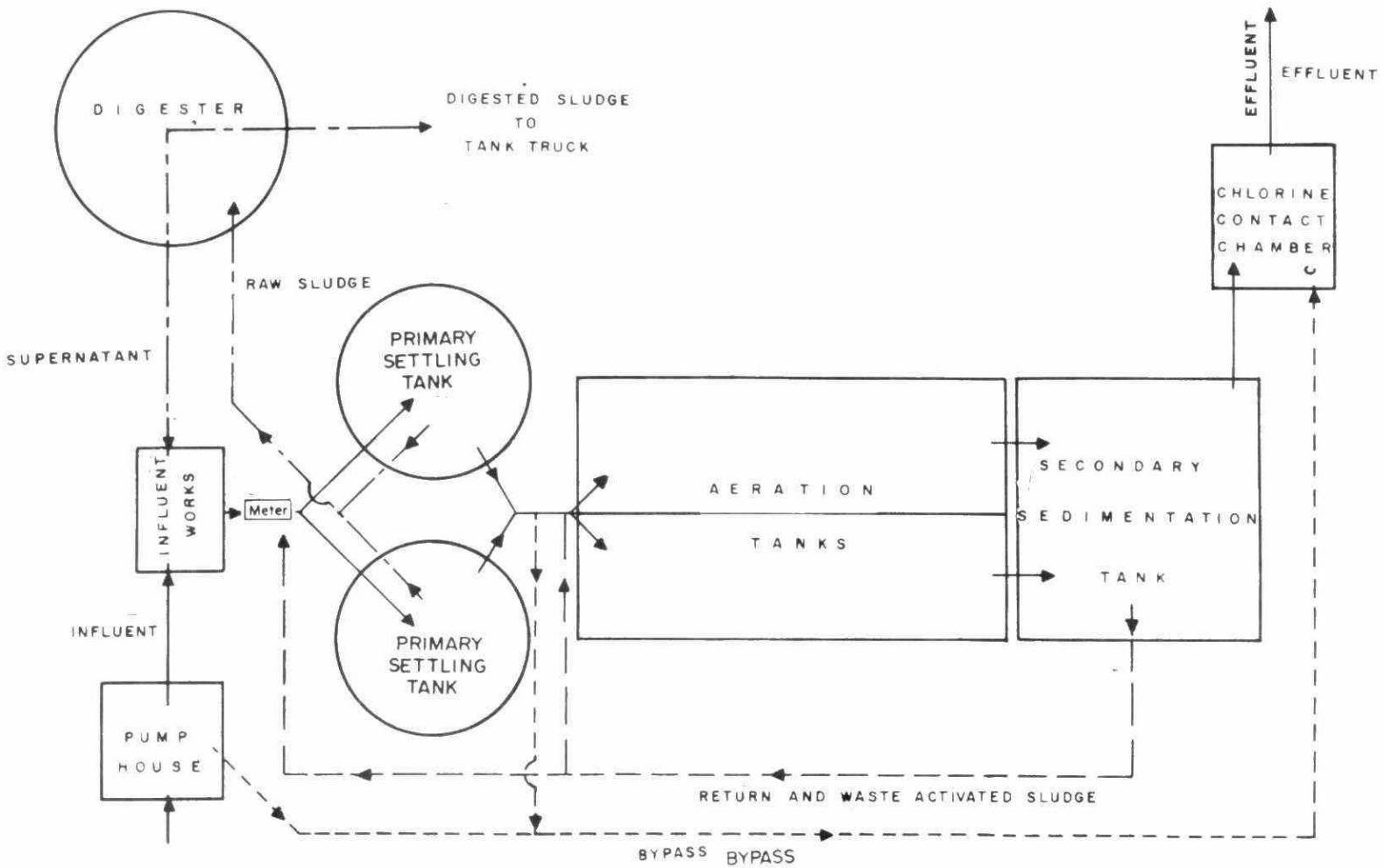
Digestion System

Type: Two-stage

Primary --
Size: Two 40' dia tanks (313,000 gal total)
Loading: 2.7 lb/ft^3/mo

Secondary --
Size: One 40' dia tank (143,000 gal)
Loading Total: 1.9 lb/ft^3/mo

BURLINGTON ELIZABETH GARDENS
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.	2-0028-58
TREATMENT	Activated Sludge
DESIGN FLOW	0.750 mgd
DESIGN POPULATION	7,500
BOD - Raw Sewage	253 mg/l
- Removal	90-95%
SS - Raw Sewage	280 mg/l
- Removal	95%

LIFE STATION

Pumps (@ 35' tdh)

One Fairbanks-Morse	600 gpm	(electric)
One Smart-Turner	250 gpm	(electric)
One Smart-Turner	125 gpm	(electric)
One Smart-Turner	300 gpm	(gas)

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: Model B (18")

Grit Removal

Type: Air degritter (with 4 Colaflex diffusers)
Size: 14' x 8' x 7' (avg depth)
Retention: 10 min

Primary Sedimentation

Type: Dorr
Size: Two 22' dia x 9' swd (6250 gal)
Retention: 2 hours
Loading: Surface, 980 gal/ft^2/day
Weir, 5,430 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Single-pass
Size: Two 98' x 19$\frac{1}{2}$' x 12'
(44,000 cu ft or 274,000 gal)
Retention: 8.8 hours

Air Supply

Two Hoffman Cyclo Blowers
Size: 750 cfm each

Diffusers

60 Colaflex diffusers per tank

Secondary Sedimentation

Type: Dorr
Size: Two 40' x 40' x 10' swd (8,600 gal)
Retention: 2.75 hours
Loading: Surface, 470 gal/ft^2/day
Weir, 4,690 gal/ft/day

CHLORINATION

W & T 200 lb/day

Chlorine Contact Chamber

Retention: 10 min

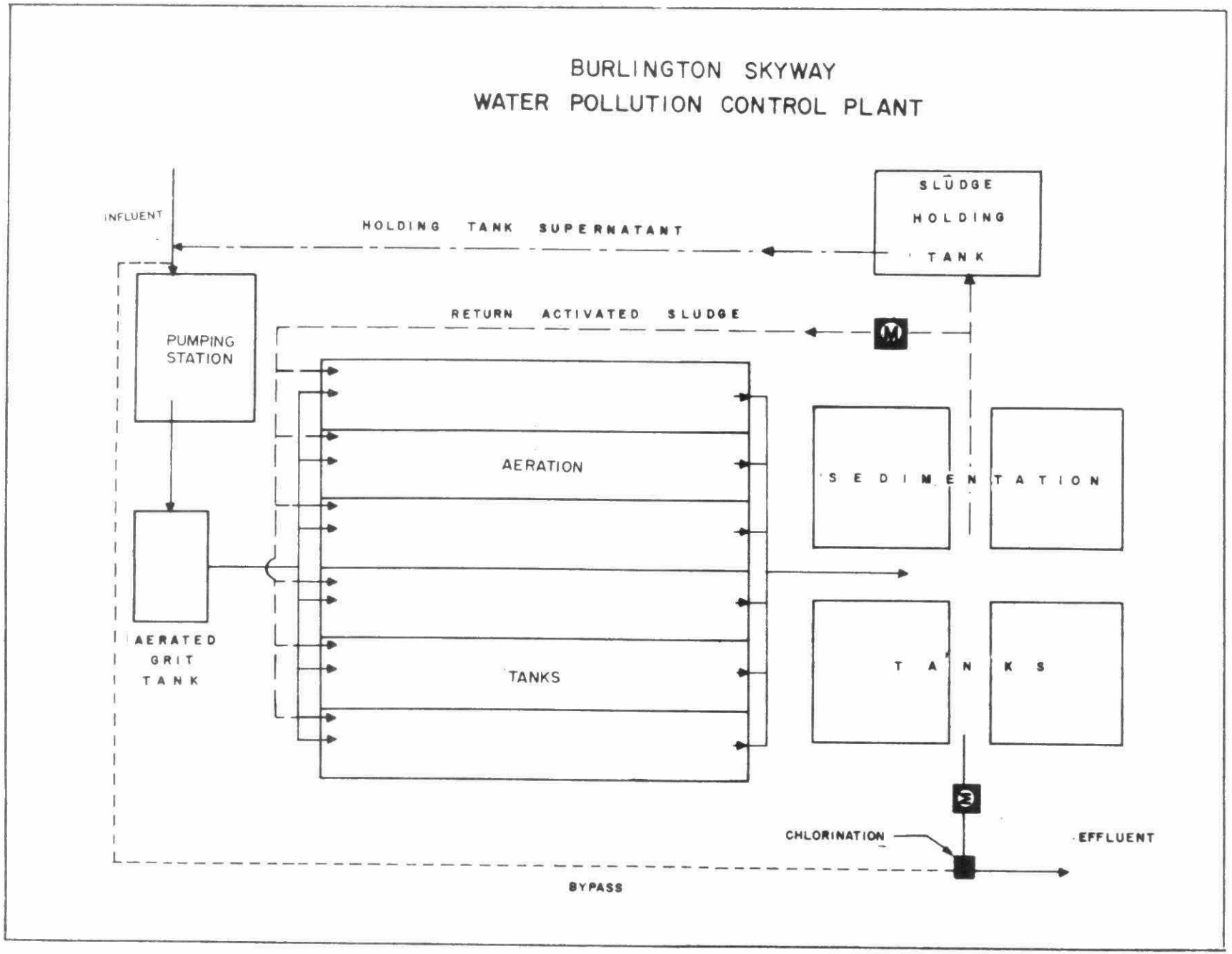
OUTFALL

- to Lake Ontario

SLUDGE HANDLING

Digestion System

Type: Single-stage with one Dorr-Oliver draft tube mixer
Size: One 45' dia x 20' swd (31,600 cu ft or 196,000 gal)
Loading: 1.6 lb/ft^3/mo


BURLINGTON SKYWAY
WATER POLLUTION CONTROL PLANT
INFLUENT
HOLDING TANK SUPERNATANT
SLUDGE HOLDING TANK
RETURN ACTIVATED SLUDGE
PUMPING STATION
AERATION
TANKS
SEDIMENTATION
TANKS
AERATED GRIT TANK
CHLORINATION
EFFLUENT
BYPASS

DESIGN DATA

PROJECT NO.	2-0105-62
DESIGN FLOW	6 mgd
BOD - Raw Sewage	200 mg/l
SS - Raw Sewage	200 mg/l

PRETREATMENT

Coarse Screening

Type: Link Belt, mechanically-cleaned
Size: $2\frac{1}{2}$" space

Lift Station Pumps (@ 30' tdh)

2 @ 6 mgd each; 2 @ 5 mgd each

Screening

Type: Link Belt, mechanically-cleaned
Size: 1" space

Grit Removal

Type: Air degritter
Size: One 20.3' x 25' x 14.2'
Retention: 20.8 min

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single pass
Size: Six 270' x 27' x 15'
(660,300 ft. or 4.12 mil gal)
Retention: 16.5 hr
Loading: 9.5 lb BOD/1000 ft^3

Air Supply

Type: Hoffman multi-stage centrifugal blowers
Size: 3-4000 cfm (max), 1-6000 (max)

Diffusers

Type: Saran-covered flexofusers
Spacing: 250 tubes per tank

Secondary Sedimentation

Type: Eimco
Size: Four 60' x 60' x 12' swd
(538,000 gal)
Retention: 4.1 hours
Loading: Surface, 434 gal/ft^2/day
Weir, 7,100 gal/ft/day

CHLORINATION

Type: Fischer & Porter
Size: Two 2000 lb/day

Chlorine Contact Chamber

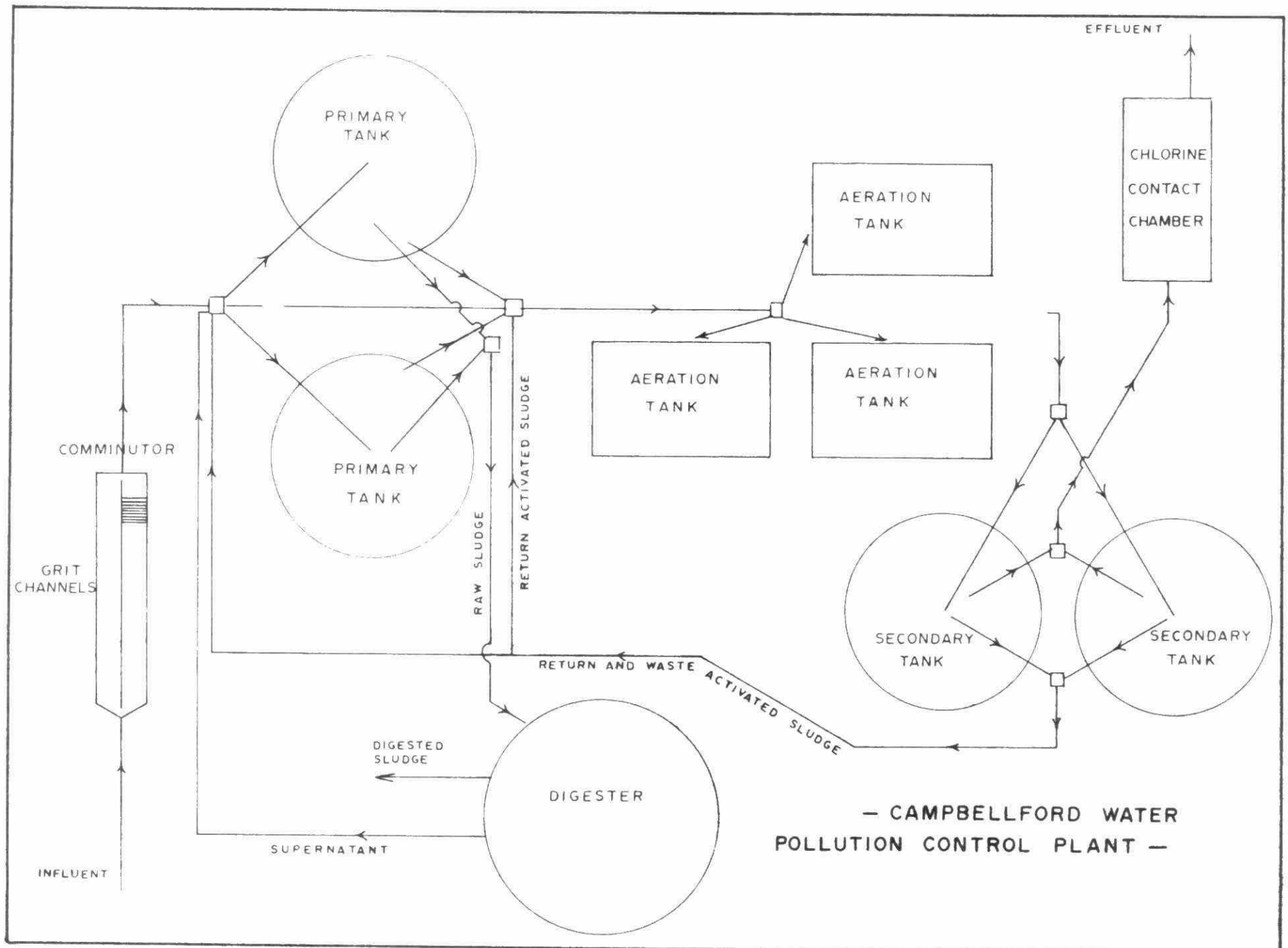
- nil
- chlorination in outfall

OUTFALL

- to Hamilton Harbour

SLUDGE HANDLING

Type: Thickening tank, decanted
Size: One 20' dia x 9' depth
(2830 ft^3 or 1760 gal)


EFFLUENT
PRIMARY TANK
CHLORINE CONTACT CHAMBER
AERATION TANK
AERATION TANK
AERATION TANK
COMMINUTOR
PRIMARY TANK
GRIT CHANNELS
RAW SLUDGE
RETURN ACTIVATED SLUDGE
SECONDARY TANK
SECONDARY TANK
RETURN AND WASTE ACTIVATED SLUDGE
DIGESTED SLUDGE
DIGESTER
SUPERNATANT
INFLUENT
— CAMPBELLFORD WATER POLLUTION CONTROL PLANT —

DESIGN DATA

PROJECT NO.	1-0028-66
DESIGN FLOW	1.0 MIGD
BOD - Raw Sewage	200 mg/l
TREATMENT	Activated Sludge
DESIGN POPULATION	4200

PRIMARY TREATMENT

Grit Removal

Type: Channels, manually cleaned
Size: Two 36'6"x2'8"x3'9"
Flow Velocity: 1 fps

Screening

Type: Manually cleaned

Comminution

Type: Worthington model 15C-5

Primary Sedimentation

Type: Dorr-Oliver-Long S-7
Size: Two 40'dia x 7' swd
Retention: 2.4 hours
Loading: Surface 400 gal/ft^2/day
Weir 4000 gal/ft/day

Outfall

- to the Trent River

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical
Size: Three, each 55,000 gallons
Retention: 4 hours
Air Supply: Simon Carves, one aerator per tank

Secondary Sedimentation

Type: Dorr-Oliver-Long S-7
Size: Two 45' dia x 9' swd
Retention: 4.8 hours
Loading: Surface 330 gal/ft^2/day
Weir 3540 gal/ft/day

CHLORINATION

Type: Wallace & Tiernan V800
Size: One 400

Chlorine Contact Chamber

Retention: 30 minutes

DIGESTION SYSTEM

Type: Single stage
Size: 30' dia x 25' swd

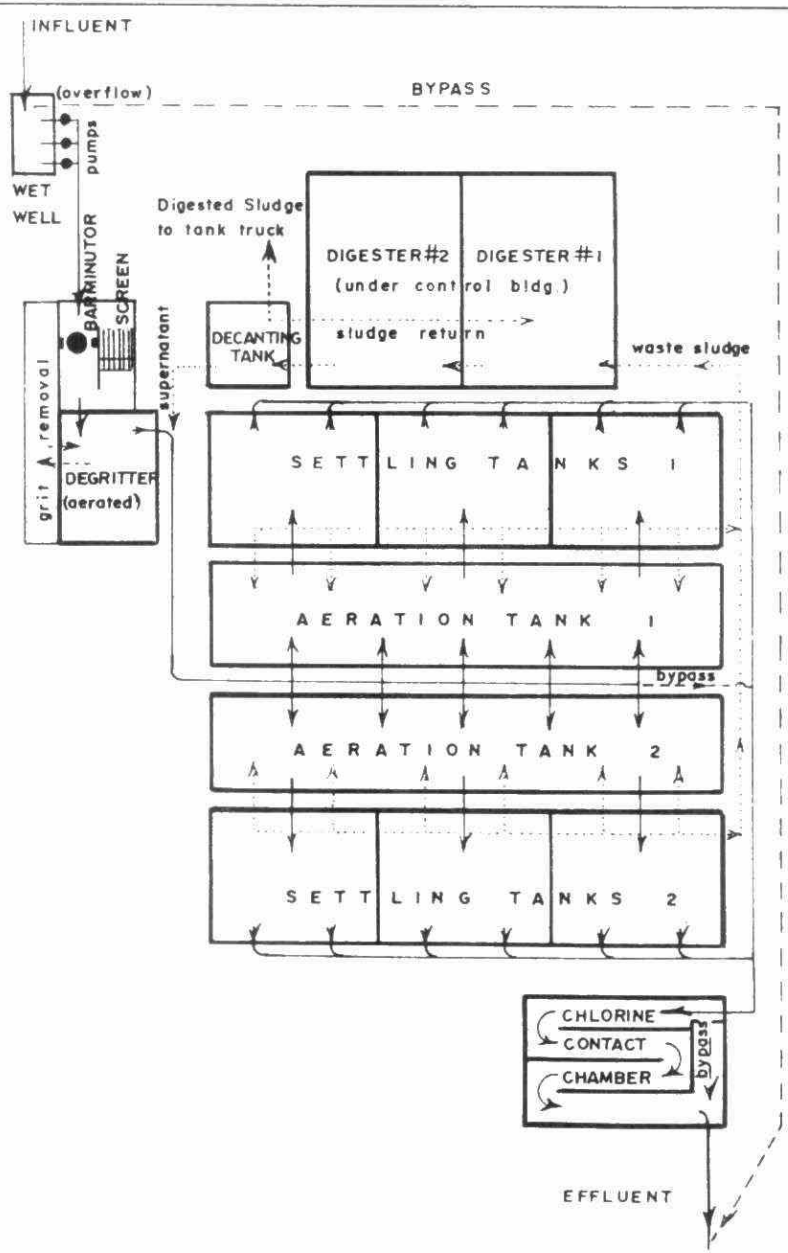
PUMPING STATION

P.S. #1

Three Crane Deming each 800 US gpm @ 38' tdh

P.S. #2

Two Flygt CP3100 each 400 US gpm @ 24' tdh



CARLETON PLACE

WATER POLLUTION CONTROL PLANT

DESIGN DATA

PROJECT NO: 1-0009-66
TREATMENT: High Rate Activated Sludge
DESIGN FLOW: 1.2 MIGD
DESIGN BOD: 108 mg/l
DESIGN SS: 126 mg/l

SEWAGE LIFT PUMPS

Type: Chicago Pump
Cap. Three 1050 IGPM @ 23' TDH

PRETREATMENT

1. Coarse Bar Screen, 2" c-c
2. Barminutor, CP model 15C-12 and bypass screen 1" c-c
3. Grit Removal - C.P. Aer-Degritter - Size 10' x 13' x 7' avg (5700 gal)

AERATION SECTION

- Tank Size: two 76' x 10'-9" x 9'-1" (90,000 gal. total)
- Detention: 1.8 hr @ 1.2 mgd
- Air Supply: Three SUTORBILT 1240 cfm
- Diffusers: C.P. FLEXOFUSERS

SETTLING TANKS

Size: Six 25' x 16' hopper bottom tanks in two sets of three (total volume: 125,000 gal)
Detention: 2.5 hr @ 1.2 mgd
Loading: 500 gpd/sq.ft.

CHLORINATION

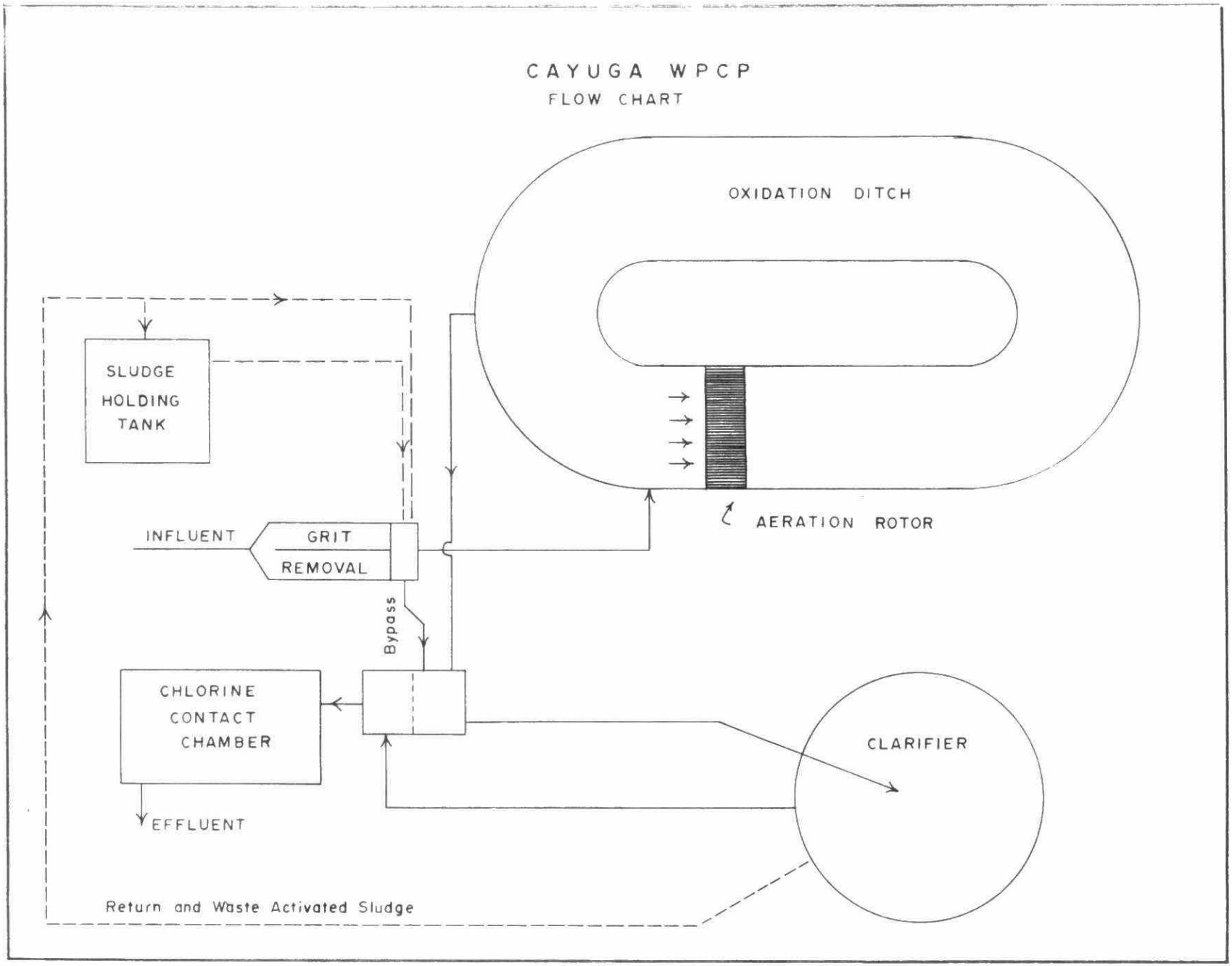
Tank Size: 26' x 20' x 6' (20,000 gal)
Detention: 24 minutes @ 1.2 mgd.
Chlorinator: W & T V-800 200 lb/day, flow prop.

AEROBIC DIGESTER

Size: Two 28' x 33'-6" x 12'-8" (160,000 gal total)

DECANTING TANK

Size: 10' x 10' hopper bottom (4300 gal)


CAYUGA WPCP
FLOW CHART
OXIDATION DITCH
SLUDGE HOLDING TANK
INFLUENT
GRIT REMOVAL
AERATION ROTOR
Bypass
CHLORINE CONTACT CHAMBER
CLARIFIER
EFFLUENT
Return and Waste Activated Sludge

DESIGN DATA

DESIGN FLOW

200, 000 gpd

GRIT REMOVAL

Type: Manually cleaned channels
Size: Two 18'6" x 1'6" x 2'6" deep

AERATION TANK

Type: Oxidation ditch with one Pumps & Softeners Ltd. rotor
Size: 23, 400 cu. ft. or 146, 000 gal.
Detention: 65 hr
Flow Velocity: 1 fps (min)

FINAL CLARIFIER

Type: Dorr-Oliver
Size: One 24' dia x 12' swd (33, 800 gal) overflow rate at design capacity 440 gal/ ft^2/day

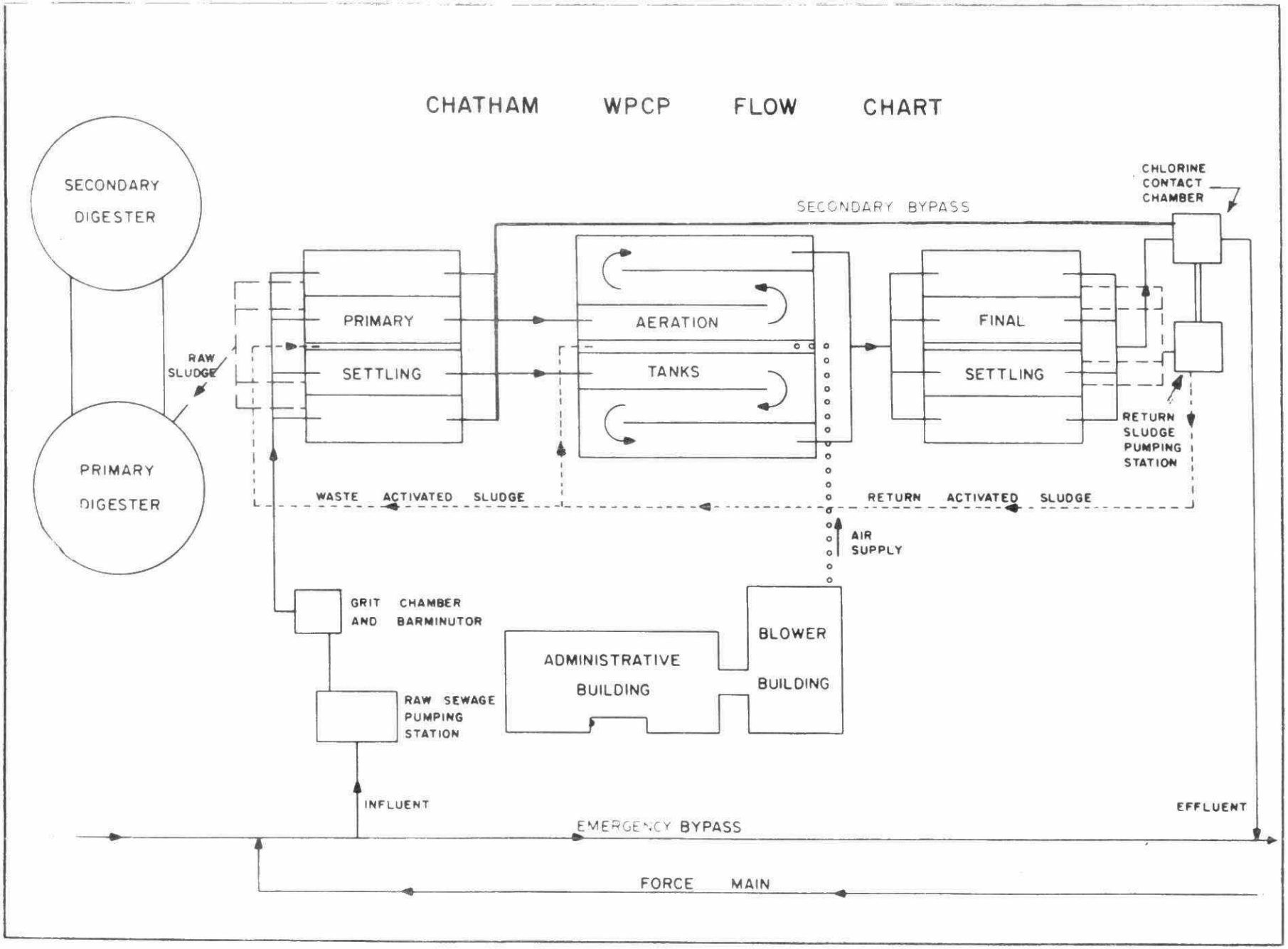
CHLORINATION

Type: Gas
Size: 50 lb/day

CONTACT TANK

Size: 4750 gal
Detention: 34 min.

CHATHAM WPCP FLOW CHART



DESIGN DATA

PROJECT NO.	2-0102-62
TREATMENT	Activated Sludge
DESIGN FLOW	4.5 mgd
DESIGN POPULATION	45,000
BOD - Raw Sewage	250 mg/l
- Removal	90%
SS - Raw Sewage	250 mg/l
- Removal	90%

RAW SEWAGE

Screening

- One manually-cleaned bar screen

Pumps

Type: Worthington
Size: Three 3750 gpm @ 47' tdh
One 3750 gpm @ 47' tdh
(electric & standby diesel)

PRIMARY TREATMENT

Grit Removal

Type: Aerated, with clamshell bucket
Size: One 27' x 14' x 11 2/3 (avg)
(27,450 gal)
Retention: 8.8 min
Air Supply: One Sutorbilt

Comminution

Type: Barminutor
Size: Two model C

Primary Sedimentation

Type: Jeffrey, two-pass
Size: Two 80' x 32' x 12' (avg)
(382,000 gal)
Retention: 2.05 hr
Loading: Surface, 878 gal/ft^2/day
Weir, 9400 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; triple pass
Size: Two 130' x 63' x 14'
(1.43 mil gal)
Retention: 7.6 hr

Diffusers

Type: Schumacher tubes
125 per pass on 12" centres

Air Supply

Type: Sutorbilt
Size: Three 2500 cfm

Secondary Sedimentation

Type: Jeffrey
Size: Two 120' x 32' x 12' (avg)
(574,000 gal)
Retention: 3.08 hours
Loading: Surface, 586 gal/ft^2/day
Weir, 8780 gal/ft/day

CHLORINATION

Type: F & P
Size: One 2000 lb/day
One 400 lb/day

Chlorine Contact Chamber

Size: One 33.6' x 30' x 10' (62,300 gal)
Retention: 22 min

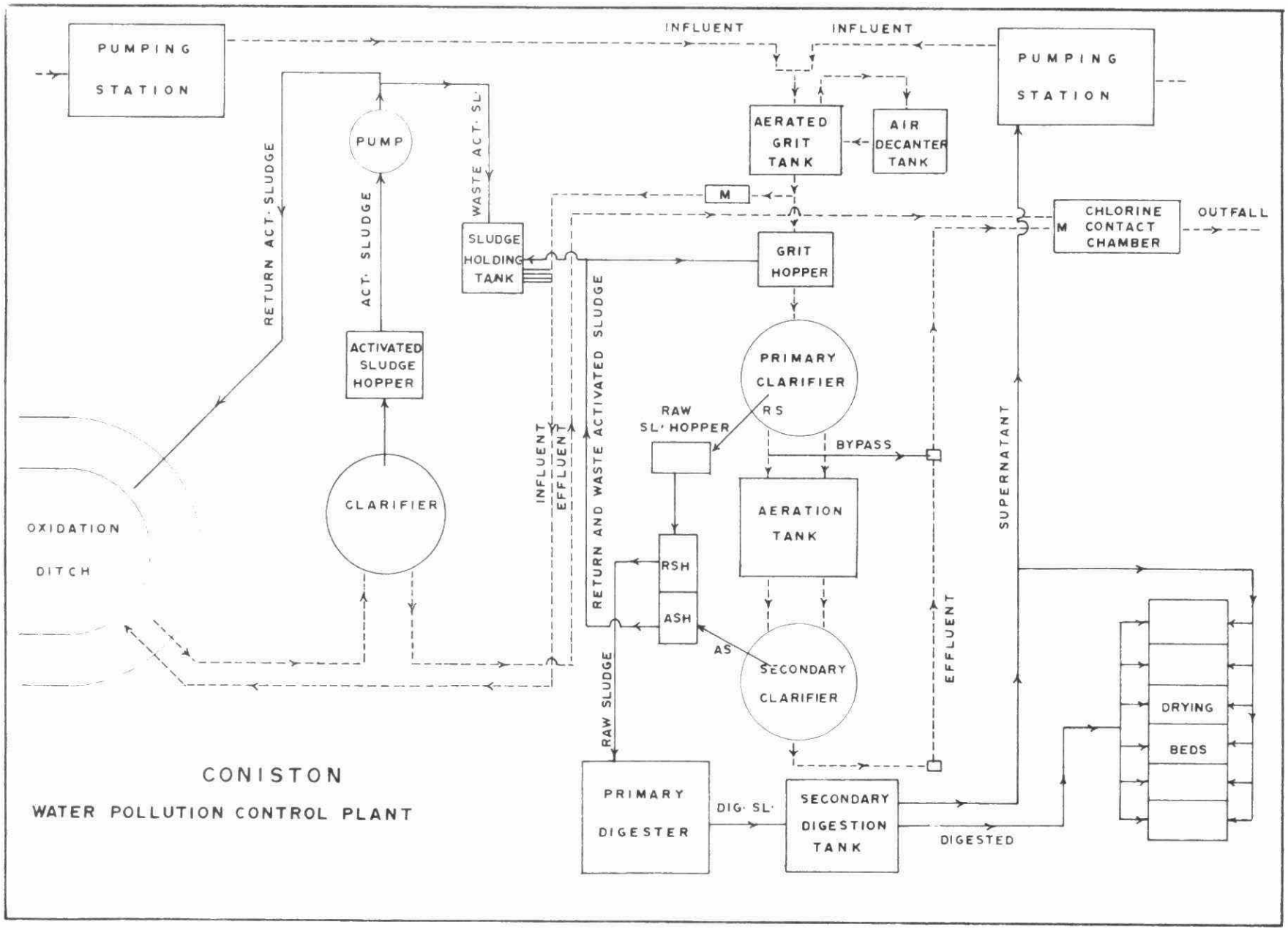
OUTFALL

- 1,025' to Thames River

SLUDGE HANDLING

Digestion System - Two-stage
Primary--
Type: Gas mixed, fixed cover
Size: One 65' dia x 25' (83,000 cu ft
or 0.52 mil gal)

Secondary--
Type: Fixed cover
Size: One 65' dia x 25' (82,000 cu ft
or 0.51 mil gal)


PUMPING STATION
INFLUENT
INFLUENT
PUMPING STATION
AERATED GRIT TANK
AIR DECANTER TANK
PUMP
WASTE ACT. SL.
RETURN ACT. SLUDGE
ACT. SLUDGE
M
CHLORINE CONTACT CHAMBER
M
OUTFALL
SLUDGE HOLDING TANK
GRIT HOPPER
ACTIVATED SLUDGE HOPPER
PRIMARY CLARIFIER
RS
RAW SL. HOPPER
BYPASS
INFLUENT
EFFLUENT
RETURN AND WASTE ACTIVATED SLUDGE
SUPERNATANT
CLARIFIER
OXIDATION DITCH
AERATION TANK
RSH
ASH
AS
SECONDARY CLARIFIER
EFFLUENT
RAW SLUDGE
DRYING BEDS
PRIMARY DIGESTER
DIG. SL.
SECONDARY DIGESTION TANK
DIGESTED
CONISTON
WATER POLLUTION CONTROL PLANT

DESIGN DATA

Project No: 2-0008-57

Treatment	Old Plant	New Plant
	Activated Sludge	Extended Aeration
Design Flow:	0.150 mgd	0.200 mgd

BOD - Raw Sewage 200 mg/l
Removal 93%

SS - Raw Sewage 250 mg/l
Removal 93%

PRIMARY TREATMENT

BAR SCREENS:
Two, in influent channels

AERATED GRIT TANK:
10' x 9.75' x 8.5' awd
Volume: 5,200 I. Gal. Detention: 21 min.

OLD PLANT

Primary Sedimentation

Type: Neco with helical scraper
Size: One 24' dia x 5.7' (18,400 gal) Retention: 2.94 hr.
Loading: Surface, 332 gal/ft^2/day (@0.15 mgd)
Weir, 1.700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration, single-pass
Size: one 29' x 29' x 15$\frac{1}{2}$' (55,800 gal) Retention: 9.3 hr.

Aerator

Type: Ames-Crosta Size: One 6' dia.

Secondary Sedimentation

Type: Ames-Crosta Type F Size: One 28' dia x 6$\frac{1}{2}$'
Retention: 4 hr.
Loading: Surface, 572 gal/ft^2/day(@ 0.15 mgd)
Weir, 720 gal/ft./day

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
One concrete fixed roof octagonal tank with 12" Ames-Crosta screw pump

Size: 19' 3" x 14' swd (4640 ft^3 or 29,000 gal)

Secondary --
One concrete tank with plank roof
Size: 10' x 10' x 8' swd (920 ft^3 or 5,700 gal)

Drying Beds

Six beds 20' x 30'

OUTFALL

- 10" Transite to creek

NEW PLANT

OXIDATION DITCH:
Capacity: 200,000 I. Gal.
Detention: 24 hours
Operating Depth 5 ft.

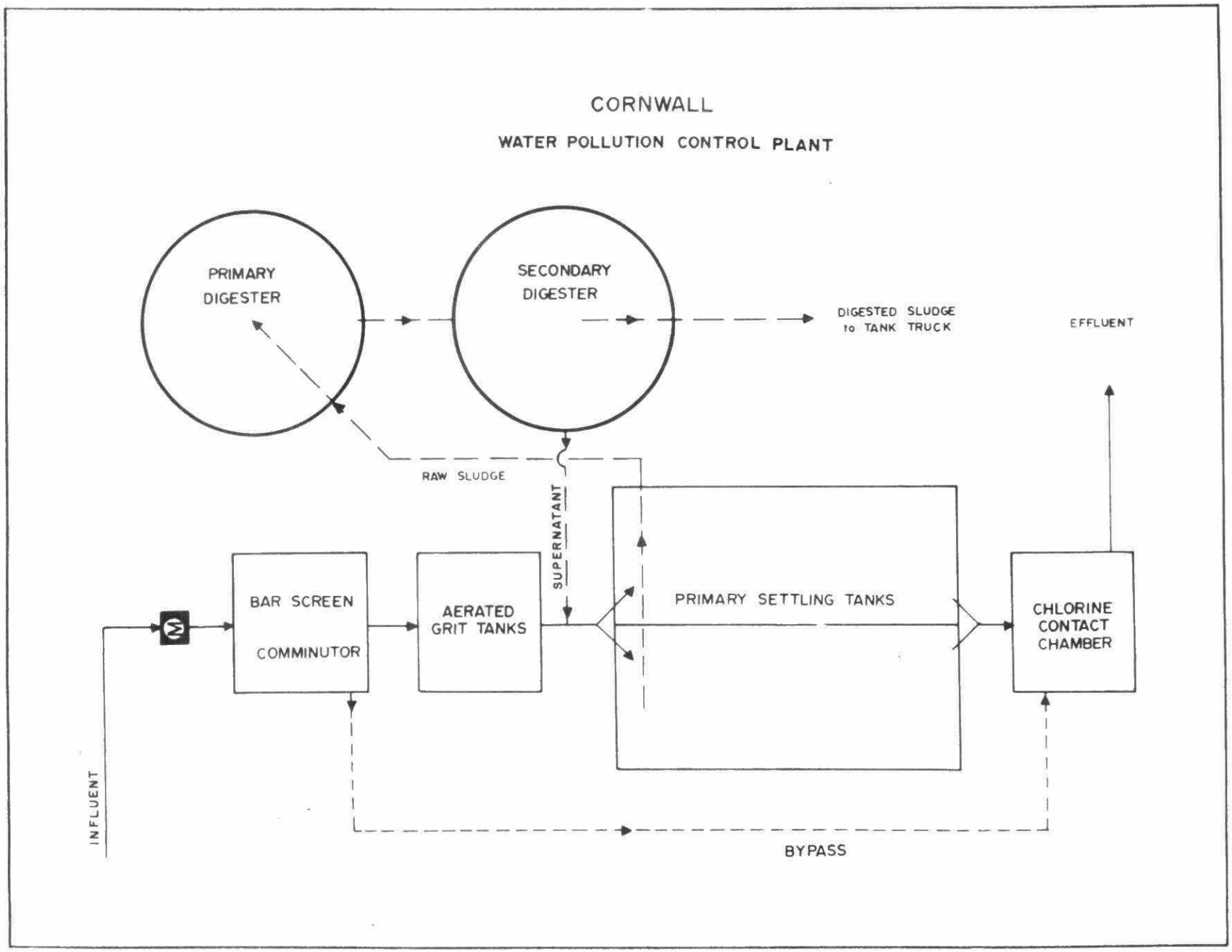
Rotor: Two, 8'2" width, each powered by
10HP motor.

CLARIFIER:
30' dia. x 8' awd
Volume: 35,000 I. Gal. Detention: 4.2 hours
Overflow Rate: 280 I. Gal/ft^2/day

SLUDGE HOLDING TANK:
12.9' x 11' x 12.9' awd
Volume: 11,000 I. Gal.

CHLORINE CONTACT CHAMBER:
Four passes, each 15' x 2.5' x 7.75' awd
Volume: 7,200 I. Gal.
Detention: 30 min.

CHLORINATOR:
Type: Fisher and Porter


CORNWALL
WATER POLLUTION CONTROL PLANT
PRIMARY DIGESTER
SECONDARY DIGESTER
DIGESTED SLUDGE to TANK TRUCK
EFFLUENT
RAW SLUDGE
SUPERNATANT
BAR SCREEN
COMMINUTOR
AERATED GRIT TANKS
PRIMARY SETTLING TANKS
CHLORINE CONTACT CHAMBER
INFLUENT
BYPASS

DESIGN DATA

PROJECT NO.	1-0001-66
DESIGN FLOW	8.25 mgd
DESIGN POPULATION	66,000

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: Two Type "C"

Screening (Bypass channel)

Size: 2" spaces

Grit Removal

Type: Aerated; grit removed by clamshell bucket
Size: Two 38' 6" x 15' 10" x 13' 5" swd (98,500 gal)
Retention: 17 min

Air Supply

Type: Hoffman
Size: Two 1,100 scfm (also for channel aeration)

Primary Sedimentation

Type: Jeffrey
Size: Two 143' x 48' x 12' (1.245 mil gal)
Retention: 3 hours
Loading: Surface, 600 gal/ft^2/day
Weir, 14300 gal/ft/day

CHLORINATION

Chlorinator

Type: W & T
Size: One 2,000 lb/day with evaporator

Chlorine Contact Chamber

Size: One 48' 7" x 26' 11" x 10' 6" (85,800 gal)
Retention: 15 min

OUTFALL

- to St. Lawrence River

SLUDGE HANDLING

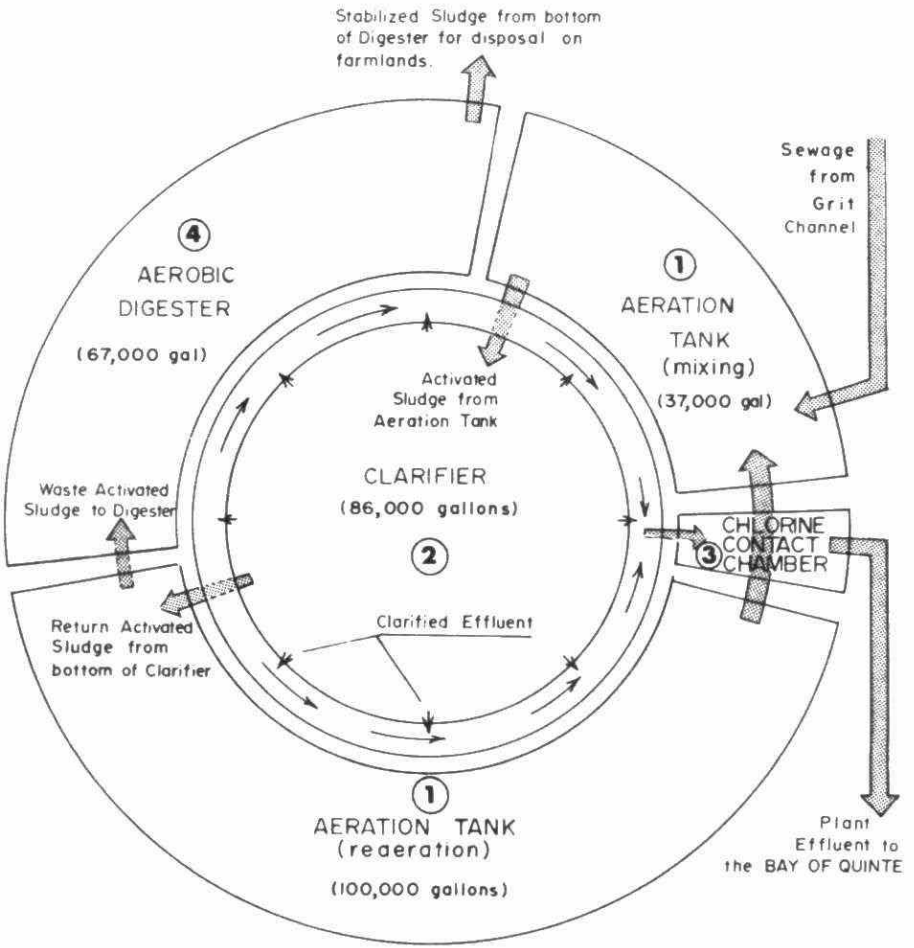
Digestion System - Two-stage

Primary Digester -
Type: Perth (gas mixed) with fixed concrete cover
Size: One 65' dia x 24' swd (82,500 cu ft or 0.515 mil gal)
Loading: 2.88 lb/cu ft/mo

Secondary Digester -
Size: One 65' dia x 24' swd (82,500 cu ft or 0.515 mil gal)
Total Loading: 1.44 lb/cu ft/mo

Disposal

- by tank truck



DESERONTO
WATER POLLUTION CONTROL PLANT

DESIGN DATA

Project No :	1-0010-66
Design Flow:	0.3 MGD
BOD :	Raw Sewage 197 mg/l Removal 90%
SS :	Raw Sewage 224 mg/l
Population :	2800

PUMPING STATION (at Plant)
2, Raw sewage pumps
Size: 416 IGPM at 23' TDH

GRIT REMOVAL:
Type: 2 manually cleaned channels
Size: 1'6" x 20' x 2' swd
Volume: 786 I. Gal. Detention: 3.8 min.

COMMINUTION:
One, type: QU250 Design: 695 IGPM

SCREENING:
Bar screen with $\frac{1}{4}$" bars on 2" centres.

BIOLOGICAL TREATMENT
(Napanee Industries Plant)
(Contact Stabilization Plant converted to Extended Aeration)

AERATION SECTION:
Volume: 37, 400 I. Gal

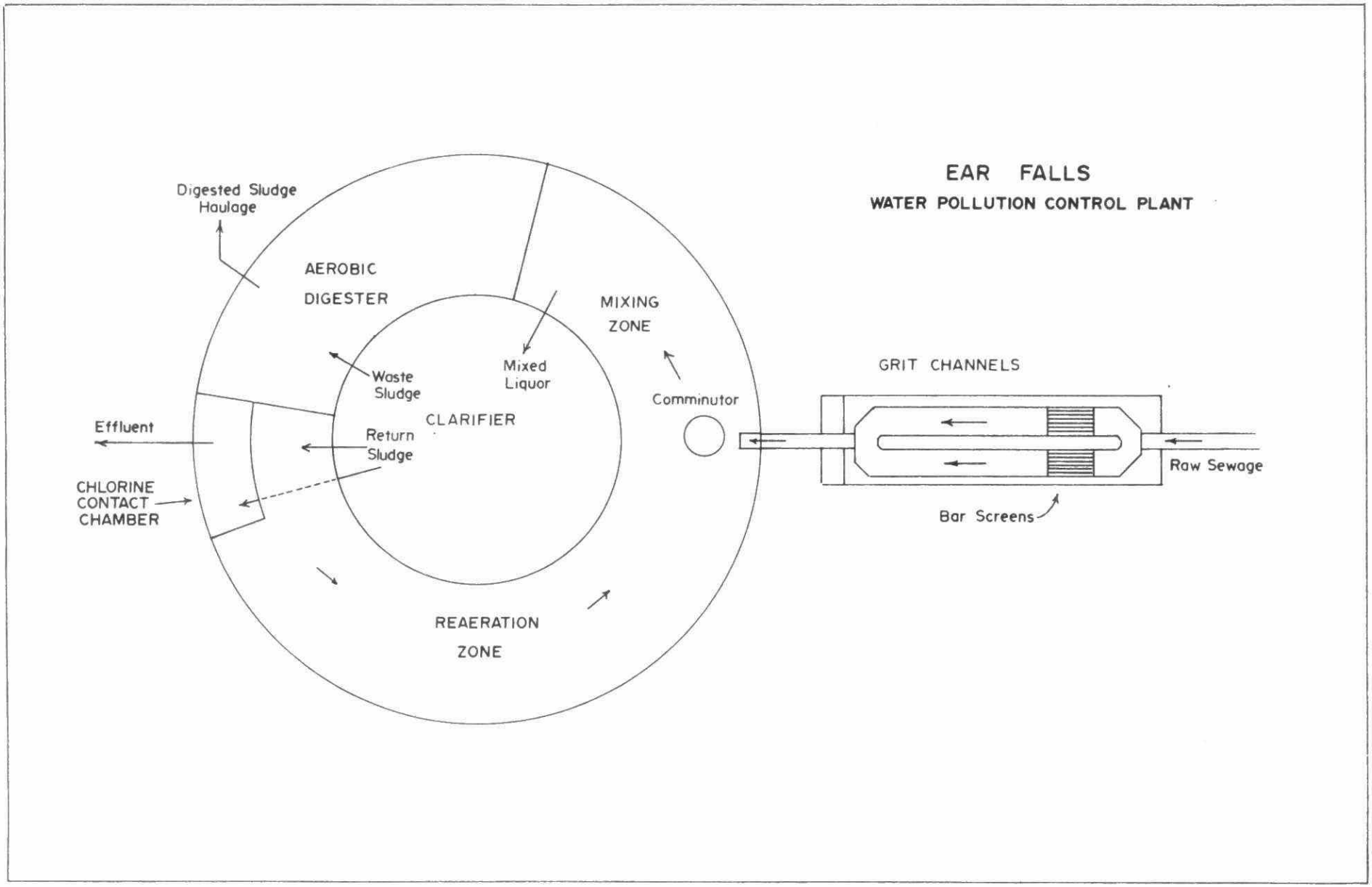
REARATION SECTION:
Volume: 99, 800 I. Gal.
Detention (as extended aeration plt) 11 hours

AEROBIC DIGESTER:
Volume: 67, 400 I. Gal.
Airlift - Return sludge : 350 IGPM
- Waste sludge: 210 IGPM
Blowers: 3, SUTORBILT
Size: 430 SCFM at 8 psi

SEDIMENTATION SECTION:
Volume: 86, 350 I. Gal. Detention: 6.9 hours
Surface overflow rate: 330 gal/ft ^{2}/day

CHLORINE CONTACT CHAMBER:
Volume 6200 I. Gal Detention: 30 min.

OUTFALL
500' 18" dia. pipe


EAR FALLS
WATER POLLUTION CONTROL PLANT
Digested Sludge Haulage
AEROBIC DIGESTER
MIXING ZONE
Waste Sludge
Mixed Liquor
CLARIFIER
Comminutor
GRIT CHANNELS
Effluent
Return Sludge
CHLORINE CONTACT CHAMBER
Raw Sewage
Bar Screens
REAERATION ZONE

DESIGN DATA

Design Flow 0.139 MIGD	
Design BOD 280 mg/l	Design SS 310 mg/l

LIFT STATION:
Pumps: 2 Type: FLYGT Star Delta
Size: 1750 rpm

GRIT CHANNELS:
2, 1.6' w x 15.0'1 x 1.8' swd equipped with bar screens
Volume (each) 270 J.G. Detention (each) 3 min.

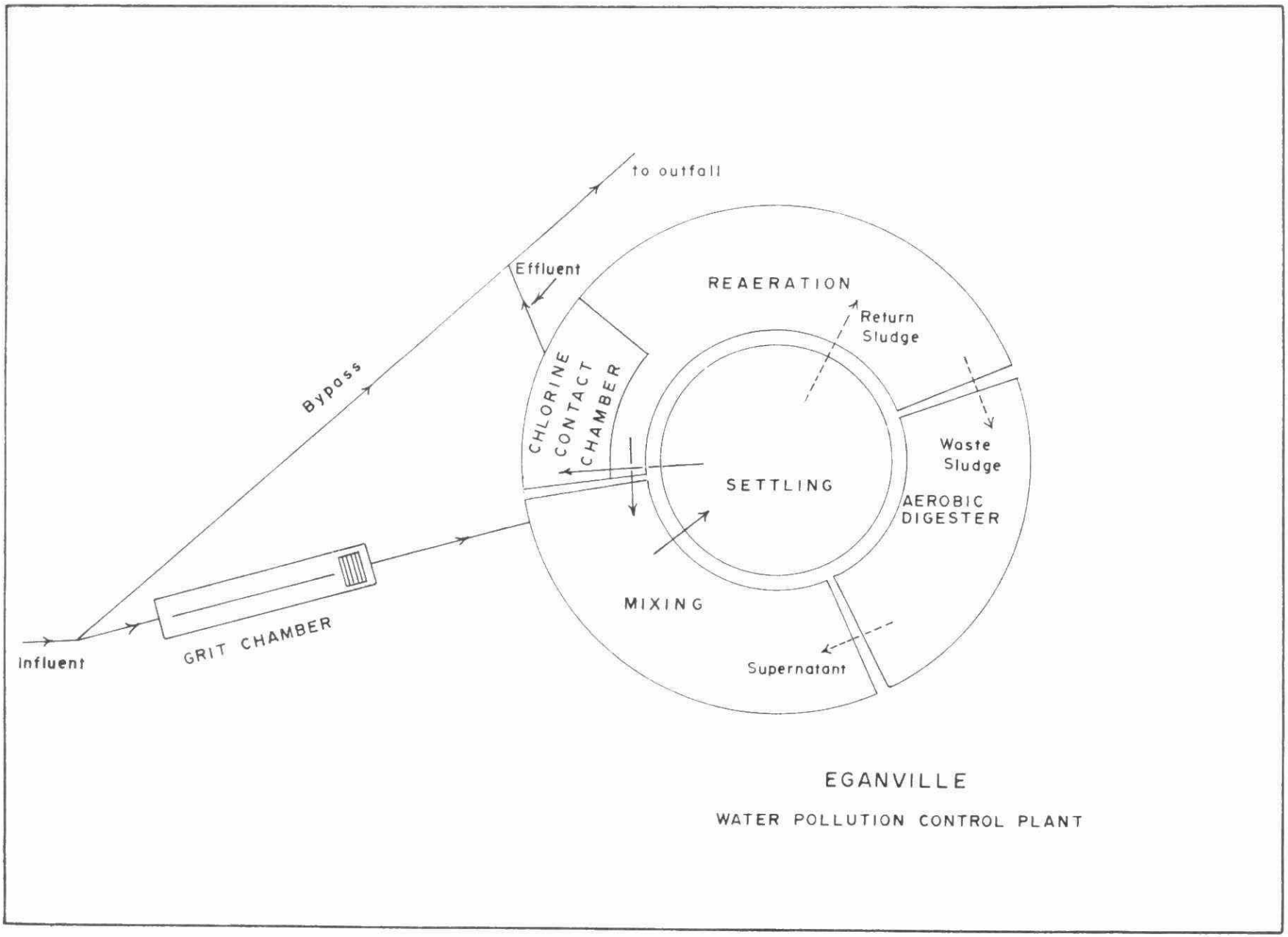
OXIGEST PLANT
(Smith & Loveless)

AERATION TANK:
(Mixing and Reaeration zones)
19.65' w x 15.25' swd x 262° arc
Volume: 63534 I.G. Detention 10.9 hours
Comminutor: Type: HELIGEAR Size: 1725 rpm, $\frac{1}{4}$ HP
Blowers: 3 type ROOTS-CONNERSVILLE
Size: 925 rpm 15 HP 275 cfmct 7 psi

CLARIFIER:
19.25' i.d. x 12.8' swd
Volume 23855 I.G. Detention 4.1 hours

AEROBIC DIGESTER:
19.65' w x 15.25' swd x 98° arc
Volume 23248 I.G. Detention 4.0 hours

CHLORINE CONTACT CHAMBER:
3.5w x 15.25' swd x 30° arc
Volume 1618 I.G. Detention 17 minutes
Chlorinator: Type: Wallace & Tiernan
Size: 20 gpm



EGANVILLE

WATER POLLUTION CONTROL PLANT

DESIGN DATA

PROJECT NO. 1-0007-66

TREATMENT Extended Aeration

DESIGN FLOW 0.168 migd

BOD - Raw Sewage
- Domestic 182 mg/l
- Creamery 154 mg/l

Removal 80%

PRIMARY TREATMENT

Grit Removal

Type: Parallel channels, manually cleaned
Size: Two 17'4" x 1'2"

SCREENING

Type: Manually cleaned
Size: $1\frac{1}{4}$" openings

COMMINUTION

Type: Aer-o-Flow Type A-12

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air
Size: 83,400 gal
Retention: 12 hours

Air Supply

Type: Dresser type RAI
Size: Three-340 scfm @ 7 psi

SECONDARY SEDIMENTATION

Size: 25'8" dia x 15' (37,500 gal)
Retention: 5.3 hours
Loading: Surface 388 gal/ft^2/day
Weir: 1170 gal/ft/day

CHLORINATION

Type: Wallace & Tiernan Type 831
Size: 20 lbs/day

Chlorine Contact Chamber

Size: 3900 gal
Retention: 30 minutes

OUTFALL

OUTFALL

- to Bonnechere River

SLUDGE HANDLING

Digestion System

Type: Aerobic
Size: 56,000 gal

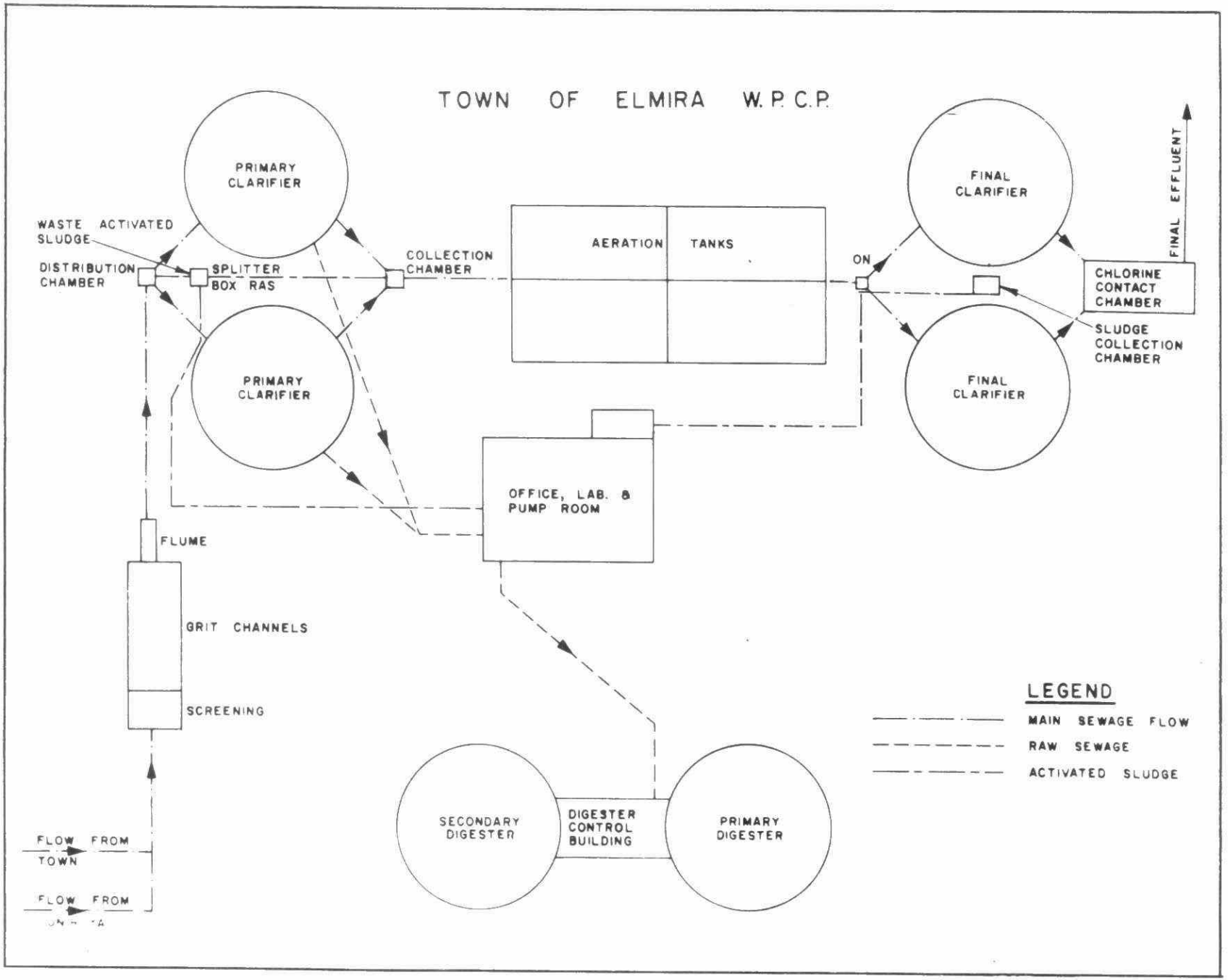
PUMPING STATIONS

North Side

Two Flygt Model CP-3100, 350 US gpm @ 35' TDH

Water Street

Two Flygt Model CP-3100, 150 US gpm @ 25' TDH


TOWN OF ELMIRA W.P.C.P.
PRIMARY CLARIFIER
WASTE ACTIVATED SLUDGE
DISTRIBUTION CHAMBER
SPLITTER BOX RAS
COLLECTION CHAMBER
AERATION TANKS
PRIMARY CLARIFIER
FINAL CLARIFIER
FINAL EFFLUENT
CHLORINE CONTACT CHAMBER
SLUDGE COLLECTION CHAMBER
FINAL CLARIFIER
OFFICE, LAB. & PUMP ROOM
FLUME
GRIT CHANNELS
SCREENING
SECONDARY DIGESTER
DIGESTER CONTROL BUILDING
PRIMARY DIGESTER
FLOW FROM TOWN
FLOW FROM
LEGEND
MAIN SEWAGE FLOW
RAW SEWAGE
ACTIVATED SLUDGE

DESIGN DATA

PROJECT NO.	2-0096-61
DESIGN FLOW	
Municipal	0.50 mgd
Industrial	0.18 mgd
Total	0.68 mgd
DESIGN POPULATION	5,000
BOD -	
Municipal	170 mg/l
Industrial	1100 mg/l
Combined	420 mg/l
SS -	
Municipal	300 mg/l
Industrial	320 mg/l
Combined	306 mg/l

PRETREATMENT -- INDUSTRIAL WASTES

Type -- Balancing tank plus neutralization facilities

PRIMARY TREATMENT

Screening

One coarse manually-cleaned bar screen

Grit Removal

Type: Grit channels, manually cleaned

Primary Sedimentation

Type: Link Belt
Size: Two 40' dia x 8' swd (125,000 gal)
Retention: 4.42 hours
Loading: Surface, 270 gal/ft^2/day
Weir, 2,700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Size: Four 30' x 30' x 14.2' (48,00 cu ft or 300,000 gal)
Retention: 10.6 hours

Aerators

Type: Four Ames-Crosta

Secondary Sedimentation

Type: Rex Chainbelt
Size: Two 45' dia x 7' swd (22,300 cu ft or 139,000 gal)
Retention: 4.9 hours
Loading: Surface, 214 gal/ft^2/day
Weir, 2,400 gal/ft/day

CHLORINATION

Type: F & P

Chlorine Contact Chamber

Size: Two 30' x 6' x 4.74' (1,700 cu ft or 10,600 gal)
Retention: 22.5 min

OUTFALL

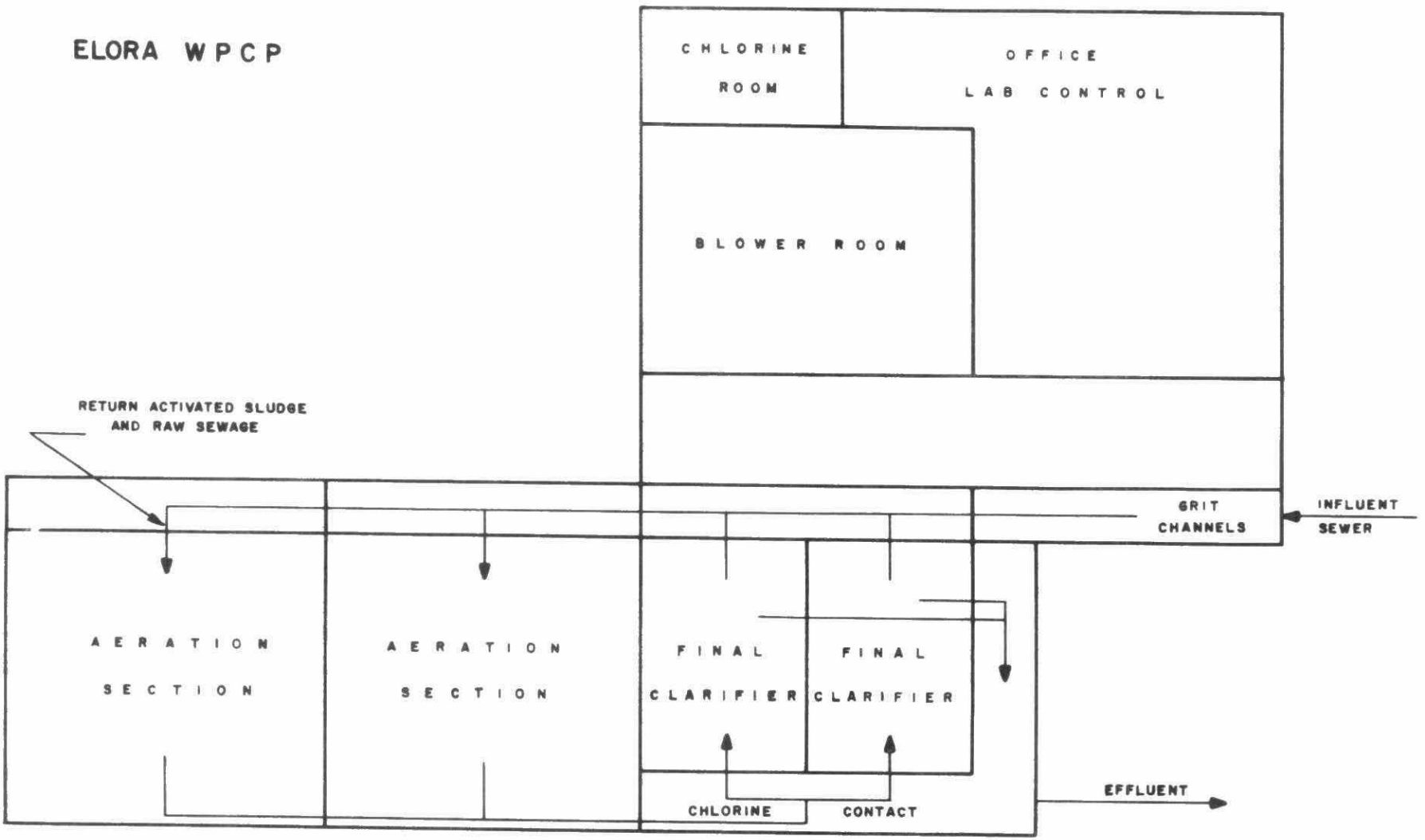
- to Canangagique Creek

SLUDGE HANDLING

Digestion System

Type: Two-stage digestion
Primary - One 30' dia tank with two Dorr mixers (97,100 gal)
Secondary - One 30' dia tank (15,200 cu ft or 94,700 gal)

ELORA WPCP


CHLORINE ROOM
OFFICE LAB CONTROL
BLOWER ROOM
RETURN ACTIVATED SLUDGE AND RAW SEWAGE
GRIT CHANNELS
INFLUENT SEWER
AERATION SECTION
AERATION SECTION
FINAL CLARIFIER
FINAL CLARIFIER
CHLORINE CONTACT
EFFLUENT

DESIGN DATA

PROJECT NO.	2-0125-62
TREATMENT	Extended Aeration
DESIGN FLOW	0.083 mgd
DESIGN POPULATION	1,000
BOD - Raw Sewage	210 mg/l
SS - Raw Sewage	250 mg/l

PRETREATMENT

Screening (at pumping station)

- Two coarse bar screens

Pumps - Robert Morse

- Two 300 gpm (electric) @ 47' tdh

Grit Removal

Type: Grit channels
Size: Two 10' x 2'

SECONDARY TREATMENT

Aeration Tanks

Type: Single-pass
Size: Two 32' x 20' x 11' (14,100 cu ft or 87,800 gal)
Retention: 25.4 hr

Air Supply

Type: Sutorbilt; variable speed pulley
Size: Two 183-370 cfm each

Diffusers

Type: Spargers
Size: 16 per tank @ 2' centres

Secondary Sedimentation

Type: Walker Process
Size: Two 26' x 6' x 7'9" deep (7,500 gal)
Retention: 4.3 hr
Loading: Surface, 266 gal/ft^2/day
Weir, 1,500 gal/ft/day

CHLORINATION

Type: Advance, Model 101

Chlorine Contact Chamber

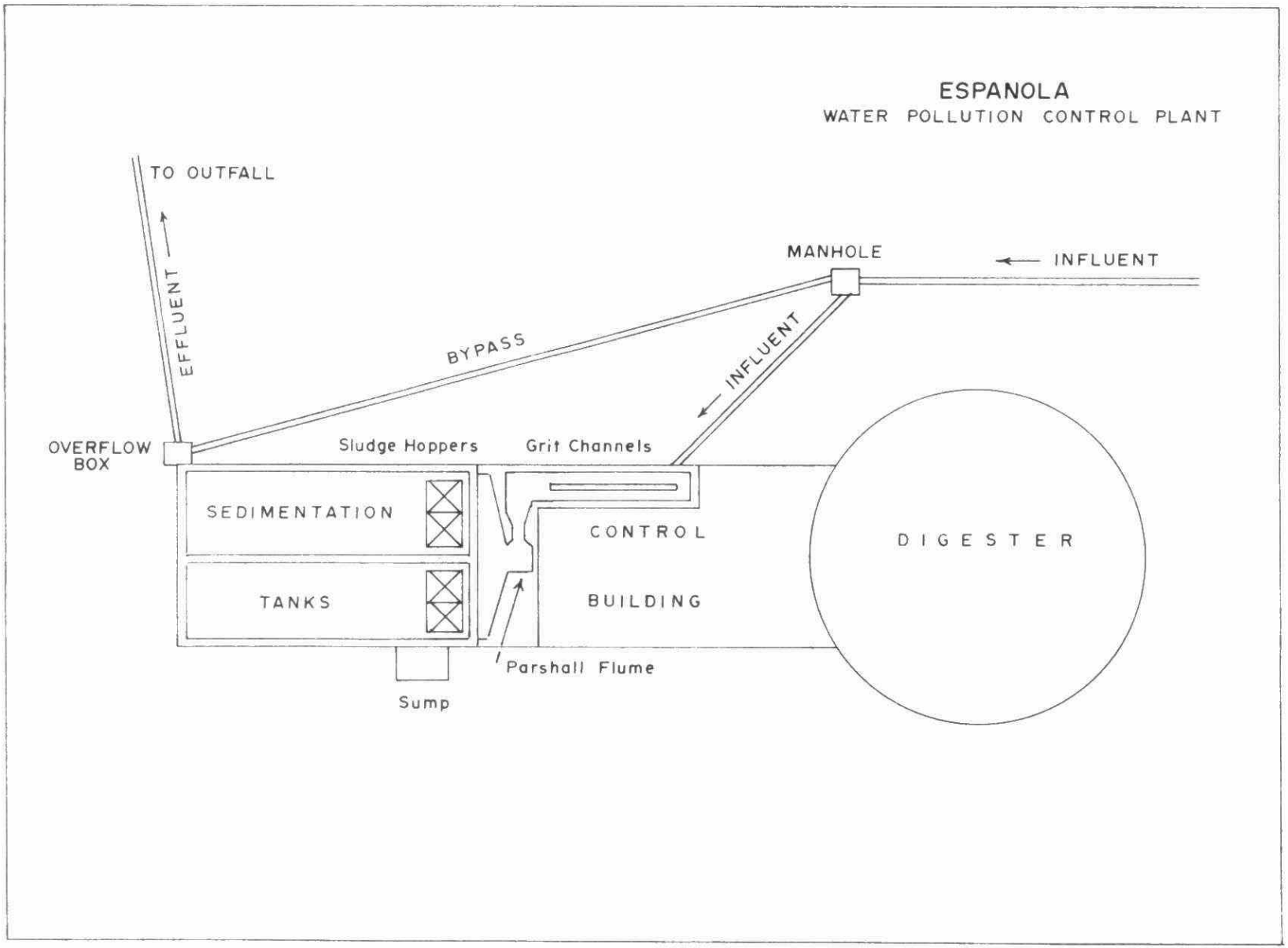
Size: 13' x 5' x 6' deep (2,180 gal)
Retention: 37.7 min

OUTFALL

- 12" dia pipe to Grand River

SLUDGE HANDLING

Type: Thickening tank
Size: 27' x 20' 8" x 11' 9" (avg) (6,750 cu ft or 42,000 gal)


ESPANOLA
WATER POLLUTION CONTROL PLANT
TO OUTFALL
EFFLUENT
BYPASS
MANHOLE
INFLUENT
INFLUENT
OVERFLOW BOX
Sludge Hoppers
Grit Channels
SEDIMENTATION
TANKS
CONTROL
BUILDING
DIGESTER
Parshall Flume
Sump

DESIGN DATA

PROJECT NO.	2-0074-61
TREATMENT	Primary
DESIGN FLOW	0.66 migd

SCREENING

2 manually cleaned bar screens

GRIT REMOVAL

Two channels - 14'6" x 1.5' x 1.07' (liq. depth)
Flow Velocity - 1.0 fps

PRIMARY SEDIMENTATION

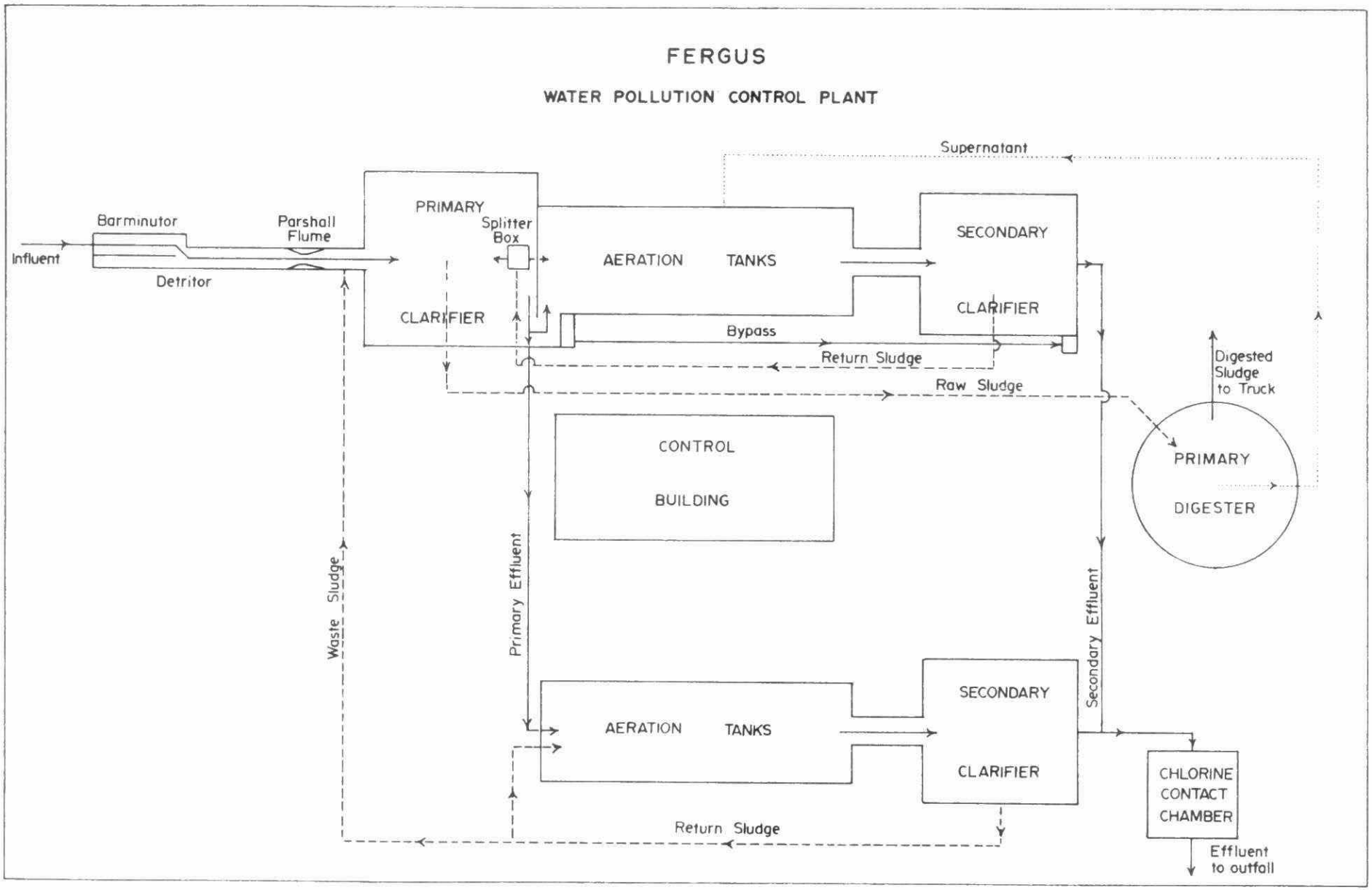
Size: Two 36' x 12' x 10'
Volume: 8640 ft^3 or 54,000 gal.
Detention: 1.95 hours
Loading: Surface 773 gpd/ft^2

OUTFALL

Spanish River

SLUDGE DISPOSAL

Single stage digestion, fixed roof
Size: One 35' dia. x 19.4' swd
Volume: 18,700 ft^3 or 116,000 gal.


FERGUS
WATER POLLUTION CONTROL PLANT
Supernatant
Barminutor
Parshall Flume
PRIMARY
Splitter Box
Influent
Detritor
AERATION TANKS
SECONDARY
CLARIFIER
CLARIFIER
Bypass
Return Sludge
Raw Sludge
Digested Sludge to Truck
CONTROL BUILDING
PRIMARY DIGESTER
Waste Sludge
Primary Effluent
Secondary Effluent
AERATION TANKS
SECONDARY
CLARIFIER
CHLORINE CONTACT CHAMBER
Return Sludge
Effluent to outfall

DESIGN DATA

Project No: 2-0023-58
Treatment: Activated Sludge
Design Flow: 1.1 mgd
BOD: Raw Sewage - 200 mg/l
Removal 90%
SS: Raw Sewage - 200 mg/l
Removal 90%

PRIMARY TREATMENT

GRIT REMOVAL:
Type: Dorr-Oliver, Type T
Detritor

COMMINUTION:
Type: Barminutor
Size: Model B (18")

PRIMARY SEDIMENTATION:
Type: Dorr-Oliver
Size: One 40' x 40' x 9' swd
Volume: 90,000 I. Gal.
Detention: 2.0 hours
Loading: Surface: 687 gal/ft^2/day

SECONDARY TREATMENT

AERATION TANKS:
Type: Mechanical Single Pass
Size 1, 72' x 24' x 10.7" swd
1, 72' x 24' x 12'2" swd
Volume (total) 269,000 I. Gal.
Retention: (total) 5.9 hours

Aerators - Ames Crosta

SECONDARY SEDIMENTATION:
Type: Dorr-Oliver
Size: Two, 35' x 35' x 9' swd
Volume (total) 137,000 I. Gal.
Detention: 3 hours
Loading - Surface 450 gal/ft^2/day

CHLORINATION:
Type: BIF Model EVS
Size: 200 lb/day

CHLORINE CONTACT CHAMBER:
Size: 40' x 15' x 7' swd
Volume: 26,000 I. Gal.
Detention: 34 min.

OUTFALL - to Grand River

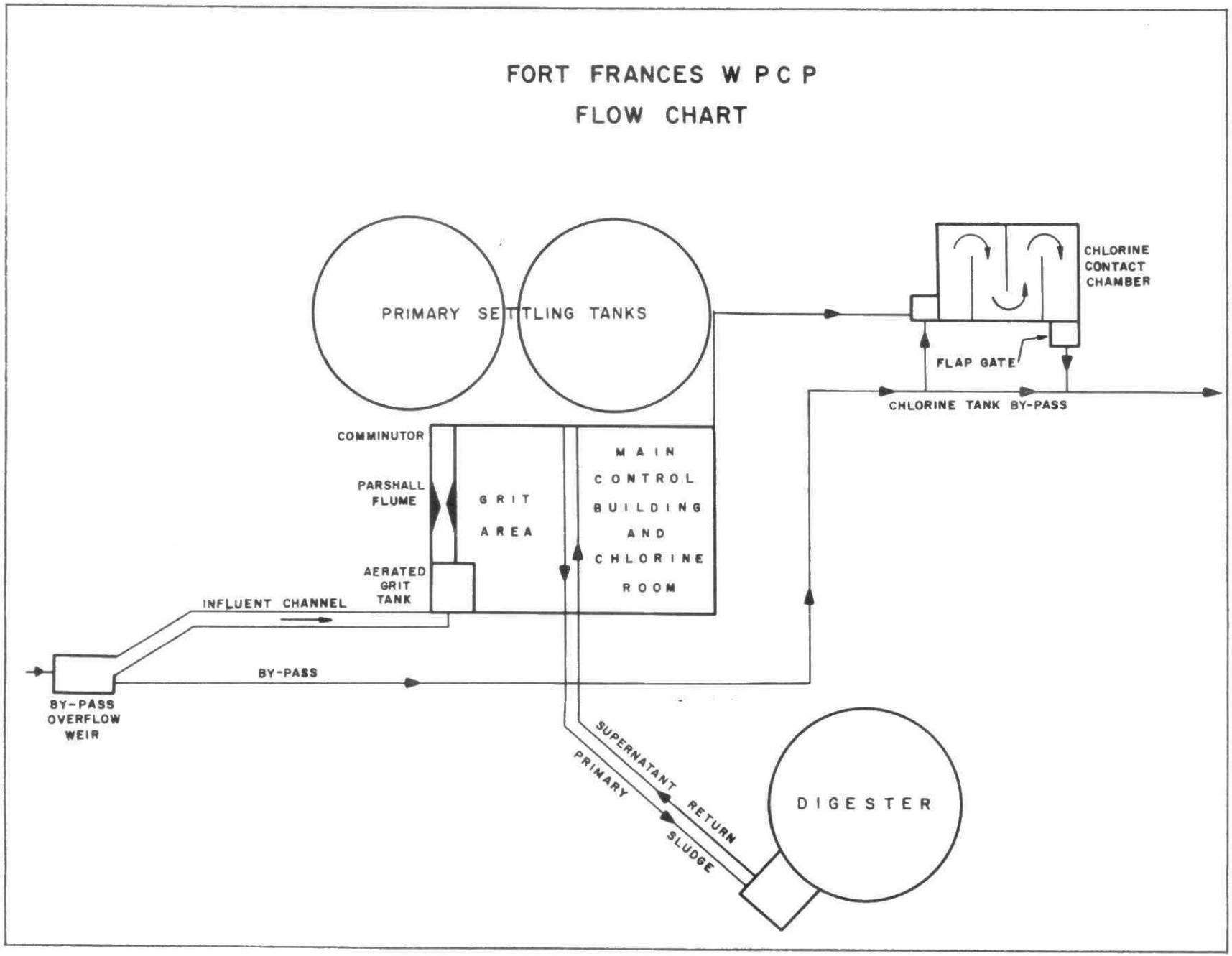
SLUDGE HANDLING

Digestion System

Type: Single stage, with floating cover and one Dorr draft tube mixer
Size: 35' dia x 22' swd (22,700 cu ft or 141,000 gal)
Loading: 1.40 lb/ft^3/mo

Drying Beds

- total area, 7,200 sq ft (discontinued use in 1964)


FORT FRANCES W P C P
FLOW CHART
PRIMARY SETTLING TANKS
CHLORINE CONTACT CHAMBER
FLAP GATE
CHLORINE TANK BY-PASS
COMMINUTOR
PARSHALL FLUME
GRIT AREA
MAIN CONTROL BUILDING AND CHLORINE ROOM
AERATED GRIT TANK
INFLUENT CHANNEL
BY-PASS
BY-PASS OVERFLOW WEIR
SUPERNATANT RETURN
PRIMARY SLUDGE
DIGESTER

DESIGN DATA

PROJECT NO.	2-0060-59
TREATMENT	Primary
DESIGN FLOW	2.0 mgd
DESIGN POPULATION	12,000
BOD - Raw Sewage	130 mg/l
- Removal	40%
SS - Raw Sewage	180 mg/l
- Removal	60%

PRIMARY TREATMENT

Screening

- Coarse bar screen (2")

Comminution

Type: Smith & Loveless Model 15R

Grit Removal

Type: Aerated; grit removed by clamshell bucket
Size: One 10' 5" x 10' 5" x 13' 9" swd (1515 cu ft or 9,400 gal)
Retention: 6.8 min

Air Supply

Type: Roots-Connersville
Size: One 100 scfm @ 9 psi

Primary Sedimentation

Type: Eimco Process
Size: Two 40' x 40' x 10' swd (32,000 cu ft or 200,000 gal)
Retention: 2.4 hours
Loading: Surface, 625 gal/ft^2/day
Weir, 9,660 gal/ft/day

CHLORINATION

Type: W & T Model A-731
Size: 400 lb/day

Chlorine Contact Chamber

Size: 27' x 20' x 8.5' (avg) (4,590 cu.ft or 28,600 gal)
Retention: 20.6 min

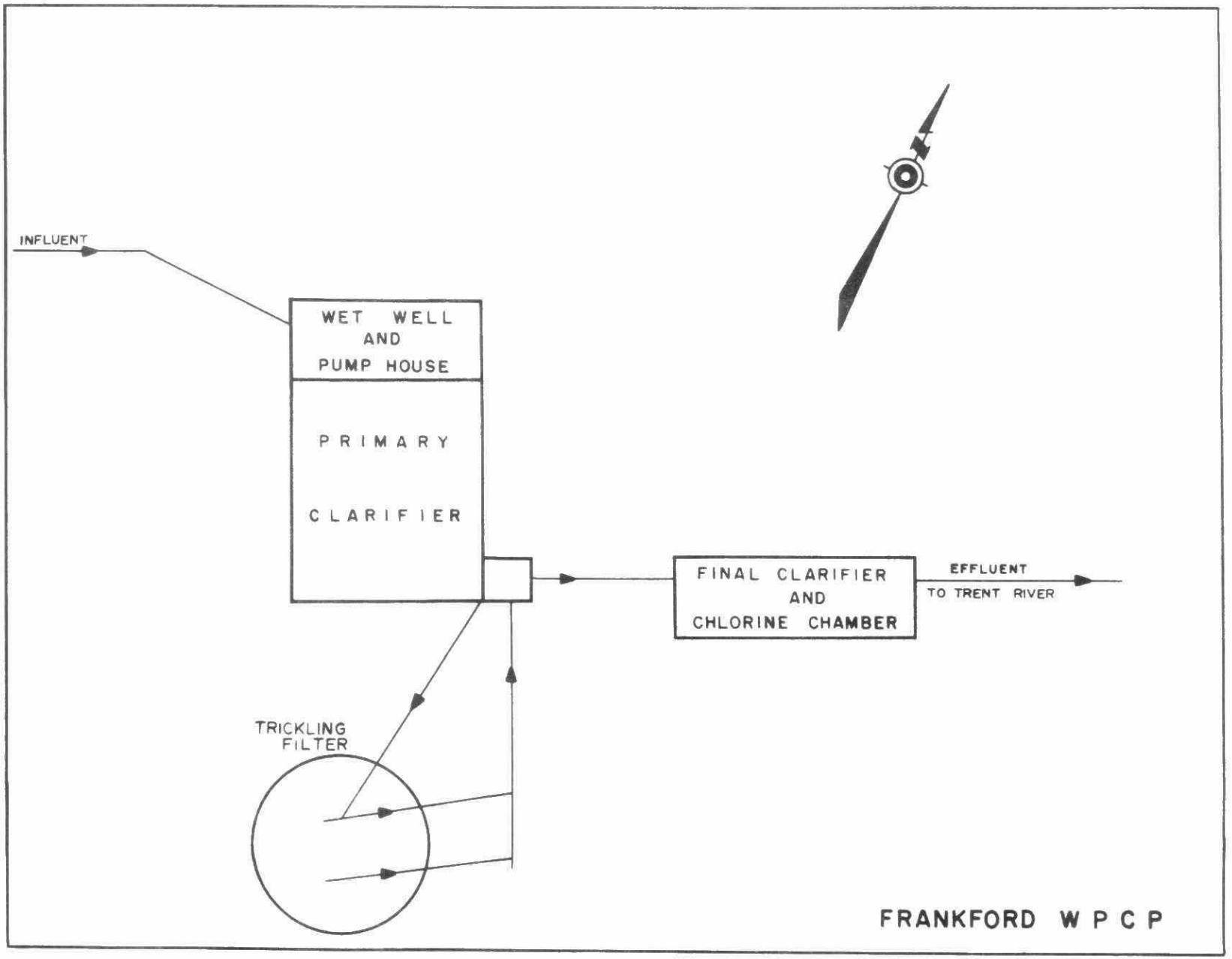
OUTFALL

- to Rainy River

SLUDGE HANDLING

Digestion System

Type: Single stage with floating cover; gas mixed
Size: One 40' dia x 25' swd (31,500 cu ft or 195,500 gal)
Loading: 1.38 lb/cu ft/mo
Mixer: Roots-Connersville Type XA


INFLUENT
WET WELL
AND
PUMP HOUSE
PRIMARY
CLARIFIER
FINAL CLARIFIER
AND
CHLORINE CHAMBER
EFFLUENT
TO TRENT RIVER
TRICKLING
FILTER
FRANKFORD W P C P

DESIGN DATA

PROJECT NO. 2-0009-57

TREATMENT Trickling Filter

DESIGN FLOW -

Primary	0.54 mgd
Secondary	0.12 mgd

SEWAGE PUMPING STATION

Pumps

1 electric, 0.54 mgd @ 20' tdh
1 gasoline standby 0.54 mgd @ 20' tdh

PRIMARY TREATMENT

Coarse bar screen @ 1" centres

Grit Removal

Type: Manually-cleaned channels
Size: Two 9' x 2' x 1' water depth
@ 0.54 mgd
Flow velocity: 0.5 ft/sec

Primary Sedimentation

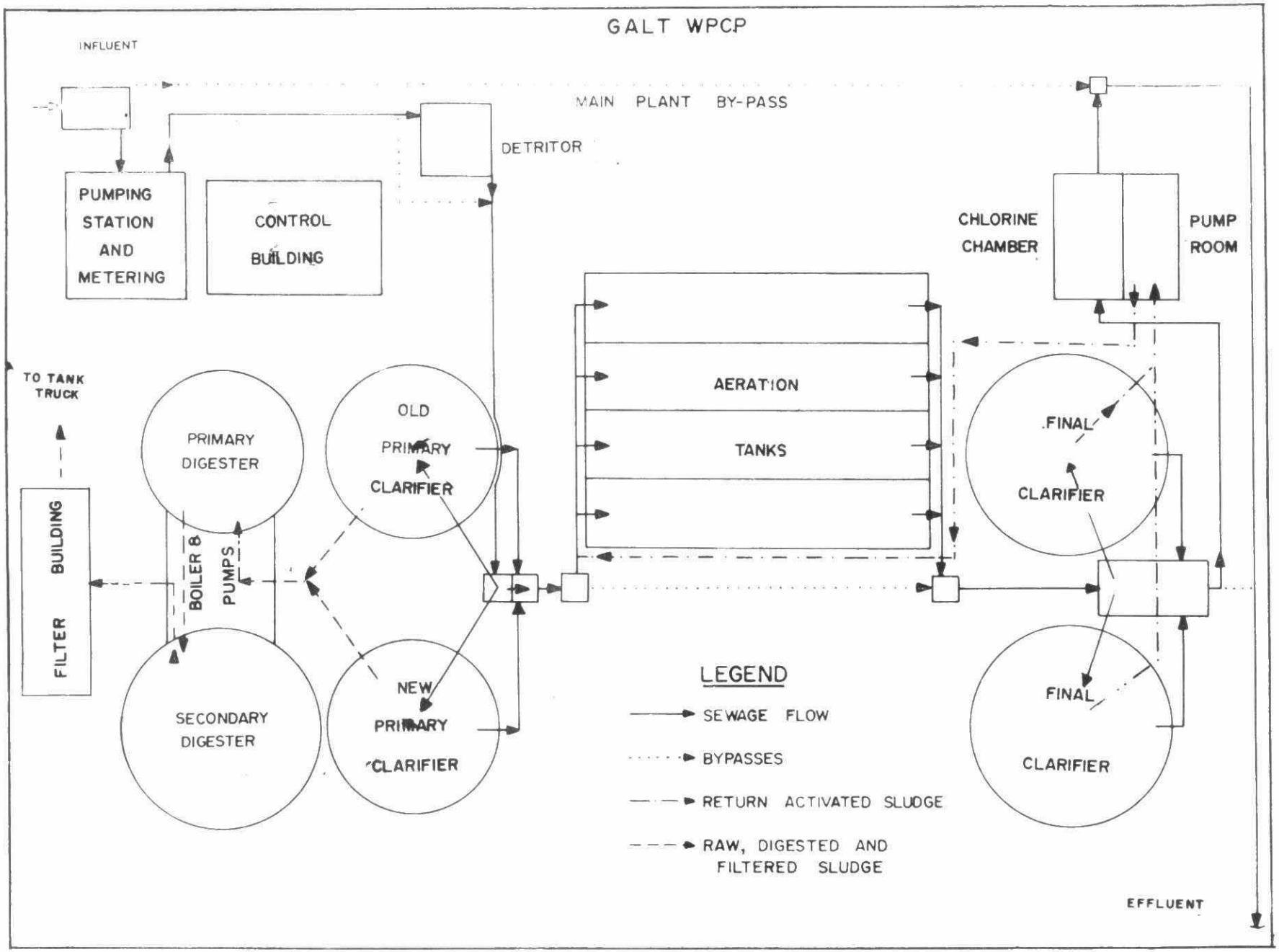
Size: One 60' x 16' 6" x 7' 5"
(46,500 gal)
Retention: 2 hr @ 0.54 mgd
Loading: Surface, 565 gpd/ft^2
Weir, 33,800 gpd/ft

SECONDARY TREATMENT

Type: Trickling filter
Size: One 42' dia x 4' depth
Recirculation: 3.1 through primary
Loading: 1.5 lb BOD/yd^3/day

SECONDARY SEDIMENTATION AND CHLORINATION

Type: Earth-banked pond
Size: One 16' x 40' x 3'
Retention: 2 hr @ 0.12 mgd


GALT WPCP
INFLUENT
MAIN PLANT BY-PASS
DETRITOR
PUMPING STATION AND METERING
CONTROL BUILDING
CHLORINE CHAMBER
PUMP ROOM
TO TANK TRUCK
PRIMARY DIGESTER
OLD PRIMARY CLARIFIER
AERATION TANKS
FINAL CLARIFIER
FILTER BUILDING
BOILER & PUMPS
SECONDARY DIGESTER
NEW PRIMARY CLARIFIER
FINAL CLARIFIER
LEGEND
SEWAGE FLOW
BYPASSES
RETURN ACTIVATED SLUDGE
RAW, DIGESTED AND FILTERED SLUDGE
EFFLUENT

DESIGN DATA

PROJECT NO.	1-0099-67
TREATMENT	Activated Sludge
DESIGN FLOW	8.5 mgd
DESIGN POPULATION	34,000
BOD - Raw Sewage	250 mg/l
- Removal	90%
SS - Raw Sewage	250 mg/l
- Removal	90%

PRIMARY TREATMENT

Comminution

Type: C.P. Barminutor
Size: One Model C (36")

Raw Sewage Pumps

Type: Babcock-Wilcox
Size: Three 3500 gpm @ 30' tdh

Grit Removal

Type: Eimco Detritor
Size: One 18' x 18' x 2' deep
(4,000 gal)
Retention: 1.15 min

Primary Sedimentation

Type: (a) Dorr (old cl.)
(b) Eimco (new cl.)
Size: Two 60' dia x 9' swd
50,600 cu ft or 315,000 gal)
Retention: 1.5 hours
Loading: Surface, 884 gal/ft^2/day
Weir, 13,250 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Single pass (5-cell)
Size: Four 150' x 30' x 13.7'
(234,000 cu ft or 1.46 mil gal)
Retention: 7.0 hours

Aerators

- Twenty Ames-Crosta

Secondary Sedimentation

Type: Eimco
Size: Two 75' dia x 10' swd
(88,400 cu ft or 550,000 gal)
Retention: 2.64 hours
Loading: Surface, 566 gal/ft^2/day
Weir, 10,600 gal/ft/day

CHLORINATION

- One F & P Automatic

Chlorine Contact Chamber

Size: One 49.25' x 21.5' x 7.25'
(46,000 gal)
Retention: 13.25 min

OUTFALL

- to Grand River

SLUDGE HANDLING

Digestion System

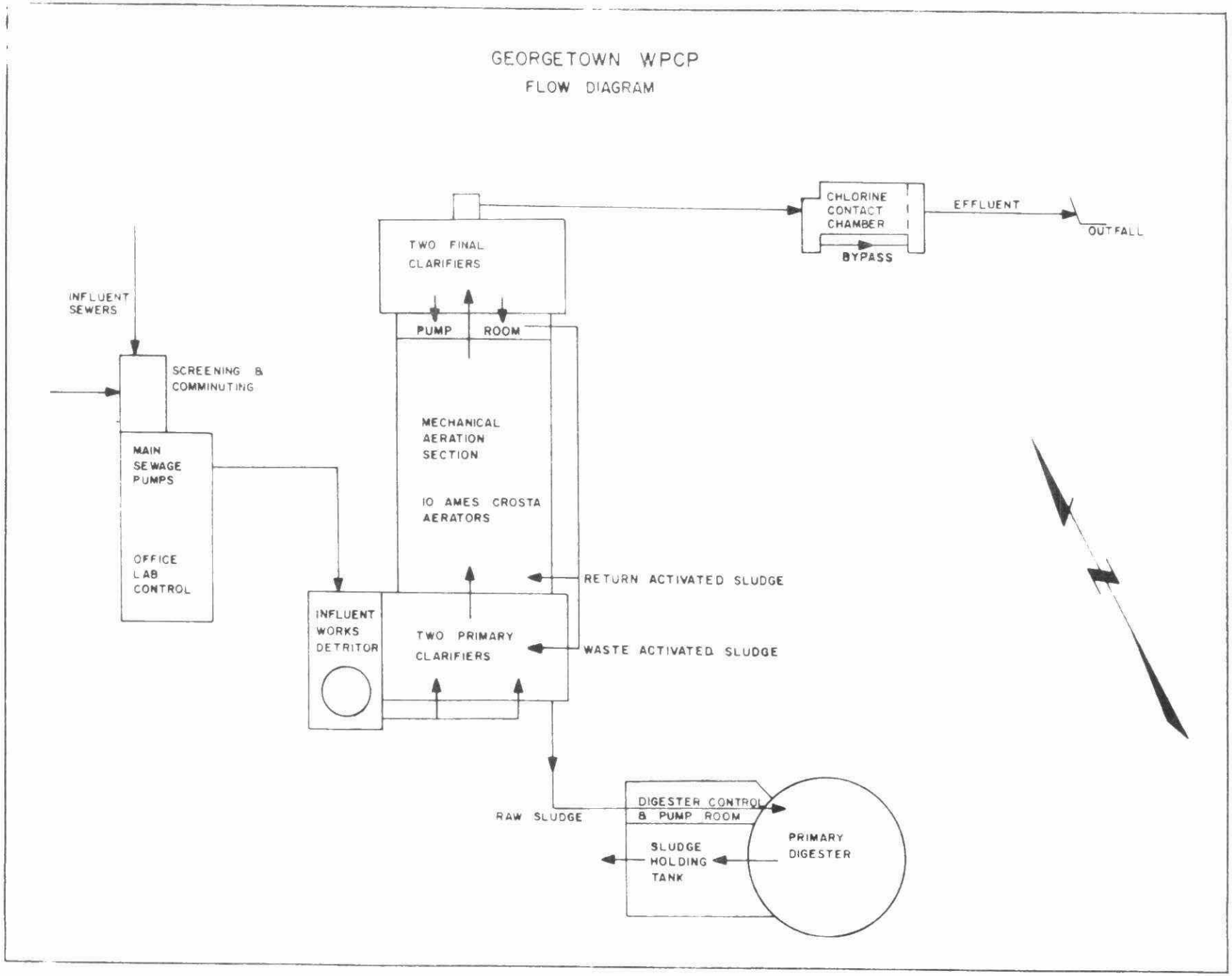
Type: Two-stage

Primary --
Type: Eimco draft tube mixers (2) on concrete roof
Size: One 50' dia x 20' swd (30,300 cu ft or 189,000 gal)

Secondary --
Size: One 70' dia x 20' swd (77,000 cu ft or 480,000 gal)

Vacuum Filter

Type: Eimco (cloth)
Size: One, 380 sq ft


GEORGETOWN WPCP
FLOW DIAGRAM
CHLORINE CONTACT CHAMBER
EFFLUENT
OUTFALL
BYPASS
TWO FINAL CLARIFIERS
PUMP ROOM
INFLUENT SEWERS
SCREENING & COMMINUTING
MECHANICAL AERATION SECTION
10 AMES CROSTA AERATORS
MAIN SEWAGE PUMPS
OFFICE LAB CONTROL
RETURN ACTIVATED SLUDGE
INFLUENT WORKS DETRITOR
TWO PRIMARY CLARIFIERS
WASTE ACTIVATED SLUDGE
RAW SLUDGE
DIGESTER CONTROL & PUMP ROOM
SLUDGE HOLDING TANK
PRIMARY DIGESTER

DESIGN DATA

PROJECT NO.	2-0017-58
TREATMENT	Activated Sludge
DESIGN FLOW	1.50 mgd
DESIGN POPULATION	15,000
BOD - Raw Sewage	200 mg/l
- Removal	95%
SS - Raw Sewage	200 mg/l
- Removal	95%

PRIMARY TREATMENT

Screening

Type: Manually cleaned bar screen
Size: 3/4" spacing

Comminution

Type: C.P. Barminutor
Size: One Model C (24")

Sewage Lift Pumps

Type: Chicago Pump
Size: Two 2,900 gpm @ 60' tdh

Grit Removal

Type: Dorr Type WA Detritor
Size: One 12' x 12' x 1' 3" (1,120 gal)
Retention: 1.1 min

Primary Sedimentation

Type: Dorr Type A
Size: Two 35' x 35' x 10' swd (24,500 cu ft or 153,000 gal)
Retention: 2.5 hours
Loading: Surface, 612 gal/ft^2/day
Weir, 5,360 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration; single-pass
Size: Two 112' x 28' x 13.25' (79,400 cu ft or 0.495 mil gal)
Retention: 7.9 hours

Aerators

- Eight Ames-Crosta

Secondary Sedimentation

Type: Dorr Type AZ
Size: Two 40' x 40' x 10' swd (32,000 cu ft or 200,000 gal)
Retention: 3.2 hours
Loading: Surface, 470 gal/ft^2/day
Weir, 4,700 gal/ft/day

CHLORINATION

- One W & T 200 lb/day

Chlorine Contact Chamber

Size: One 45' x 15' x 6' deep (27,000 gal)
Retention: 26 min

OUTFALL

- to Silver Creek

SLUDGE HANDLING

Digestion System

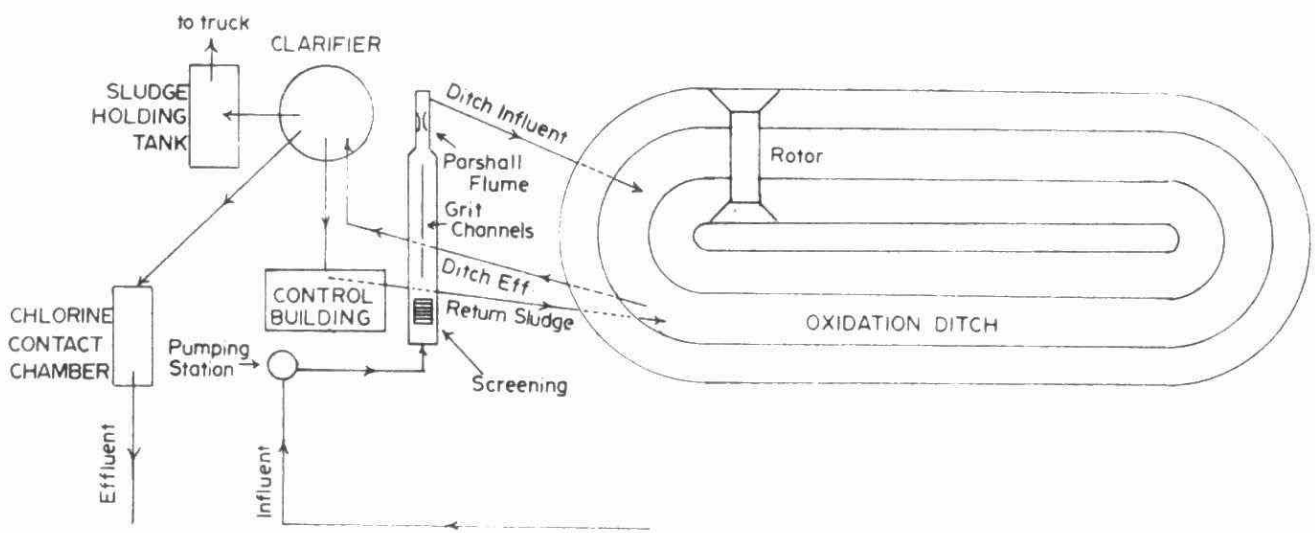
Type: Two-stage

Primary --
Type: Dorr draft tube mixers (3) on fixed steel roof
Size: One 66' dia x 22.6' (avg) (77,800 cu ft or 485,000 gal)
Loading: 1.1 lb/cu ft/mo

Secondary --
Size: One 34' x 34' x 16.25' (20,700 cu ft or 129,000 gal)
Total Loading: 0.87 lb/cu ft/mo

GRAND VALLEY

WATER POLLUTION CONTROL PLANT



DESIGN DATA

Design Flow 0.13 MIGD

RAW SEWAGE PUMPING:
2, FLYGT CP100 Size: 370 IGPM at 27' TDH

GRIT CHANNELS:
2, each 43' x 2'w x 2' swd
Volume (each) 1073 I.G. Detention: 12 min.
Bar screens in GRIT chamber

OXIDATION DITCH:
Length 159' Design water level 4.5'
Volume: 130,000 I.G. Detention: 24 hours
Rotor Type: Pumps and Softners
Size: 27.5" dia. x 10' length
Motor: $7\frac{1}{2}$ HP 1750 rpm

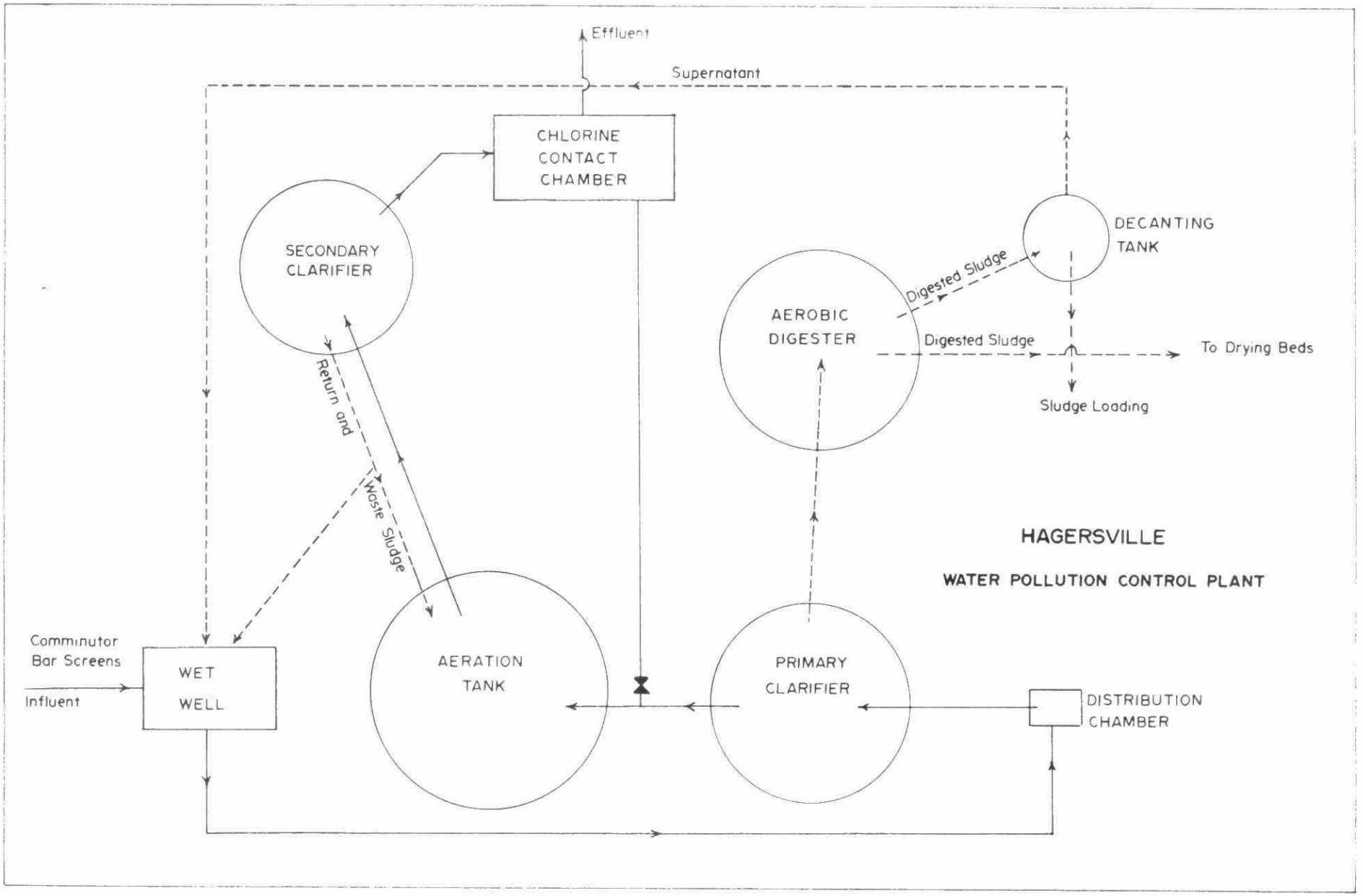
CLARIFIER:
18' dia. x 10.25' swd
Volume: 16,280 I.G. Detention: 3.0 hours
Collector mechanism type 'DORR-OLIVER-LONG'

SLUDGE PUMPS:
2 Type: CRANE DEMING
Size - 150 USGPM at 11' TDH

SLUDGE HOLDING TANK:
12' x 8' x 9.5' swd
Volume: 5242 IG Detention: 58 min.

CHLORINE CONTACT CHAMBER:
1' ' x 6' x 5' swd (5-passes)
Volume: (total) 2691 I.G. Detention: 30 min.

CHLORINATOR:
BIF Hypochlorinator
Capacity 11 USGPD at 125 psi


Effluent
Supernatant
CHLORINE CONTACT CHAMBER
SECONDARY CLARIFIER
DECANTING TANK
Digested Sludge
AEROBIC DIGESTER
Digested Sludge
To Drying Beds
Sludge Loading
Return and
Waste Sludge
HAGERSVILLE
WATER POLLUTION CONTROL PLANT
Comminutor
Bar Screens
Influent
WET WELL
AERATION TANK
PRIMARY CLARIFIER
DISTRIBUTION CHAMBER

DESIGN DATA

Design Capacity 0.25 MIGD

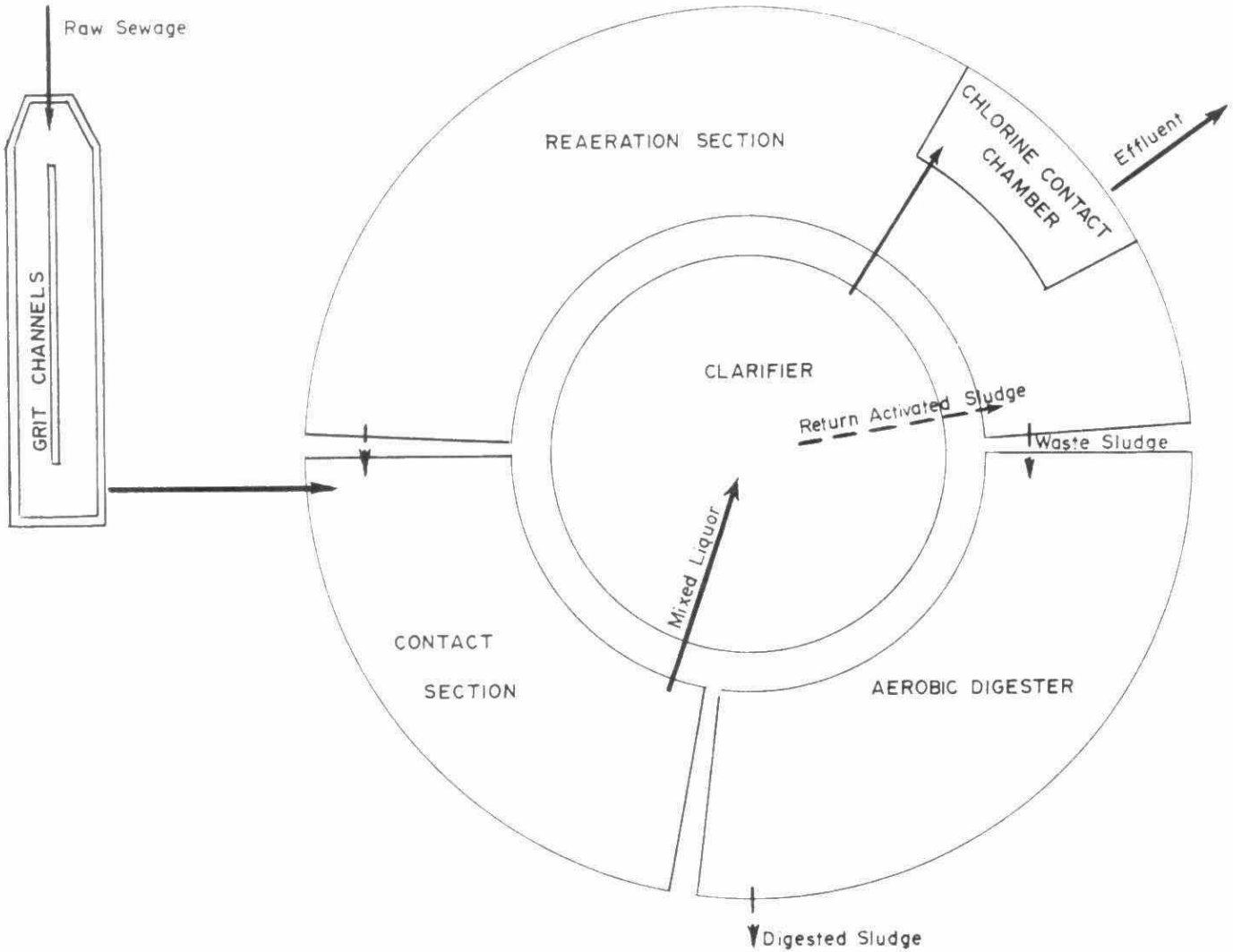
PRIMARY CLARIFIER:
25' dia. x 10' swd
Volume: 30644 I. gal. Detention: 2.9 hours
Surface overflow rate: 510 gal/ft^2 / day

AERATION TANK:
36' dia. x 8' swd
Volume: 50831 I. gal. Detention: 4.8 hours

SECONDARY CLARIFIER:
24' dia. x 9' swd
Volume: 25415 I. gal Detention: 2.4 hours
Surface overflow rate: 551 gal/ft^2/day

CHLORINE CONTACT CHAMBER:
6.5' x 15.5' x 7'
Volume: 4400 I. gal. Detention: 25 min.

SLUDGE DRYING BEDS:
Area: 7600 ft^2



HAILEYBURY WPCP

DESIGN DATA

PROJECT NO.	1-0069-67
DESIGN FLOW	0.350 mgd
BOD - Raw Sewage	170 mg/l
- Removal	90%
SS - Raw Sewage	200 mg/l
- Removal	90%

PUMPING STATION

Two - 625 IGPM @ 61 ft TDH
One Diesel engine

GRIT REMOVAL

Type: Manually cleaned channels
Size: Two

SCREENING

Bar Screen 1 3/4" openings

AERATION

Volume: 8,300 ft^3 or 52,400 gal
Detention: 3.6 hr @ 0.35 mgd
Diffusers: S & L Aluminum

REAERATION SECTION

Volume: 21,330 ft^3 or 132,900 gal
Detention: 7.6 hr @ max. return rate of 417,600 Igpd

AEROBIC DIGESTER

Volume: 15,000 ft^3 or 93,400 gal
Loading: 4.3 ft^3/capita

SEDIMENTATION

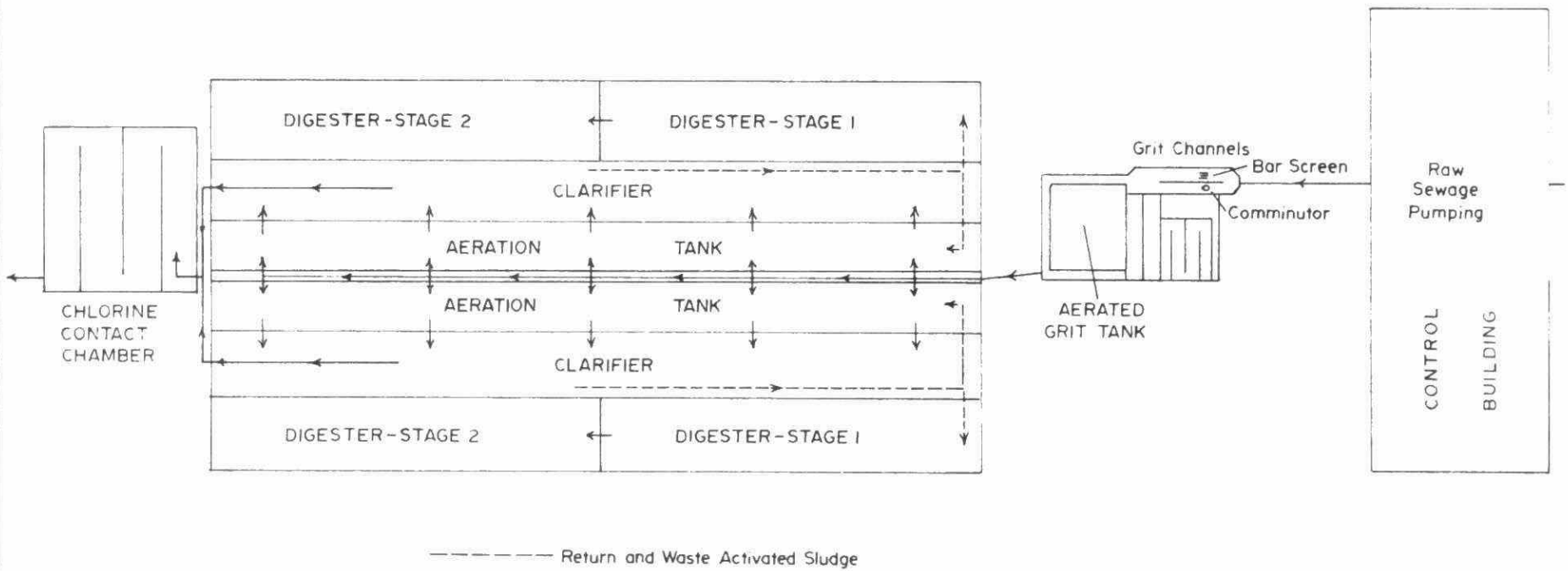
Volume: 12,100 ft^3 or 75,500 gal
Detention: 5.7 hr @ 350,000 Igpd
Loading: Surface weir

CHLORINE CONTACT CHAMBER

Volume: 8600 gal
Detention: 35 min @ 0.35 mg

HESPELER

WATER POLLUTION CONTROL PLANT



DESIGN DATA

Project No: 1-0033-66
Treatment: High Rate Activated Sludge
Design Flow: 2.05 MIGD
BOD: Raw Sewage -4535 lb/day
SS: Raw Sewage -4080 lb/day

PRETREATMENT

Raw Sewage Pumps:
One: Crane Deming Size: 400 USGPM
Three: Crane Deming Size: 300 USGPM

Comminutor:
Type: CORD 16B

Air Degritter:
Size: 11.75' x 14' x 8' swd
Volume: 8200 I. Gal. Retention: 5.8 min.
Mechanism: CHICAGO PUMP

BIOLOGICAL TREATMENT

Aeration Tanks:
Two, 150' x 7.25' x 13.5' (avg)
Volume: 320,000 I. Gal. Retention: 3.6 hours

Clarifiers:
Two, 150' x 12.25' x 12.0' awl
Volume: 206,000 I. Gal.
Retention: 2.4 hours
Overflow rate: 545 gpd/sq.ft.

Aerobic Digesters - Stage 1:
Size: Two, 74.5' x 14.75' x 13.5' awl
Volume: 250,000 I. Gal.

Aerobic Digesters - Stage 2:
Size: Two, 74.5' x 14.75' x 13.5' awl
Volume: 250,000 I. Gal.

Blowers: Type: Three SUTORBILT 3100
Size: 3550 cfm. 150 HP Motors.

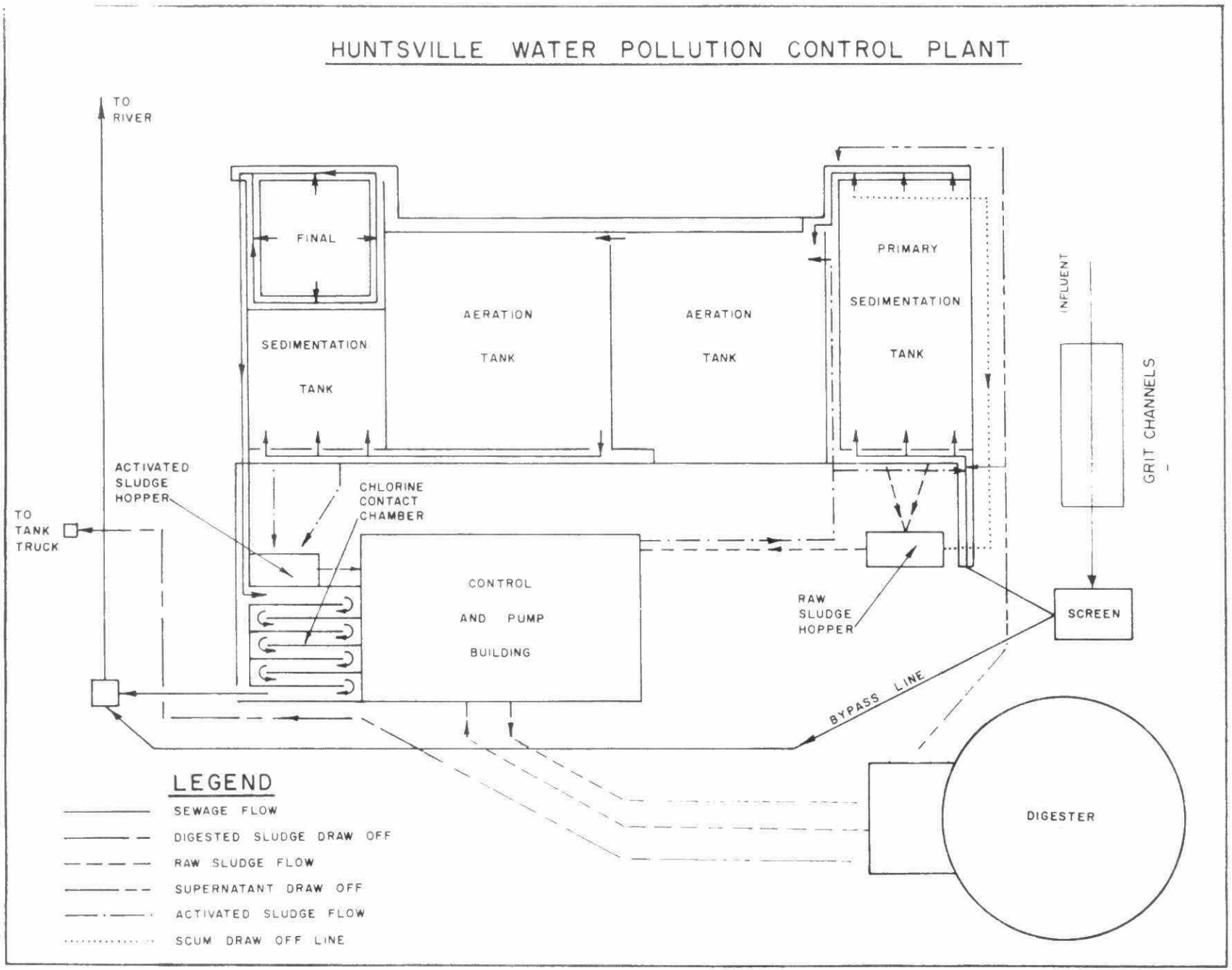
Sludge Pump: Type: MEYERS 40 MPD
Size: 7½ HP

CHLORINATION

Chlorine Contact Chamber:
30' x 28' x 9' (4-pass)
Volume: 47,000 I. Gal.
Retention: 33 min.

Chlorinator:
Type: W & T A811
Capacity: 500 lb/day

HUNTSVILLE WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.	2-0015-58
TREATMENT	Activated Sludge
DESIGN FLOW	0.25 mgd
DESIGN POPULATION	3,000
BOD - Raw Sewage	250 mg/l
- Removal	90-95%
SS - Raw Sewage	250 mg/l
- Removal	90-95%

PRIMARY TREATMENT

Grit Removal

Type: Manually cleaned channels
Size: Two 10' x 1'7" x 3'4"
(2 x 52½ cu ft)
Velocity: 0.99 fps

Screening

Type: Manually cleaned bar screen

Primary Sedimentation

Type: United Steel Corp.
Size: One 30' x 10' x 8' (15,000 gal)
Retention: 1.5 hr
Loading: Surface, 833 gal/ft^2/day
Weir, 25,000 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Size: Two 24' x 24' x 12' (87,500 gal)
Retention: 8.4 hr

Aerators: Chicago Pump (2)

Secondary Sedimentation

Type: United Steel Corp.
Size: One 30' x 13' x 12' (29,300 gal)
Retention: 2.8 hr
Loading: Surface, 640 gal/ft^2/day
1 Weir, 5,300 gal/ft/day

CHLORINATION

Type: W & T
Size: One 20 lb/day

Chlorine Contact Chamber

Size: One 12' x 11½' x 10' swd
(6,250 gal)
Retention: 36 min

OUTFALL

- 105' of 15" corrugated pipe to Muskoka River

SLUDGE HANDLING

Digestion System - Single-stage

Type: Mixed by recirculation, Fairbanks-Morse, 100 gpm @ 40' tdh
Size: One 30' dia x 20' swd (15,000 cu ft or 93,500 gal)
Loading: 1.2 lb/cu ft/mo

PUMPING STATIONS

Pumping Station #1

Type: Chicago Pump
Size: Two 290 gpm

Pumping Station #2

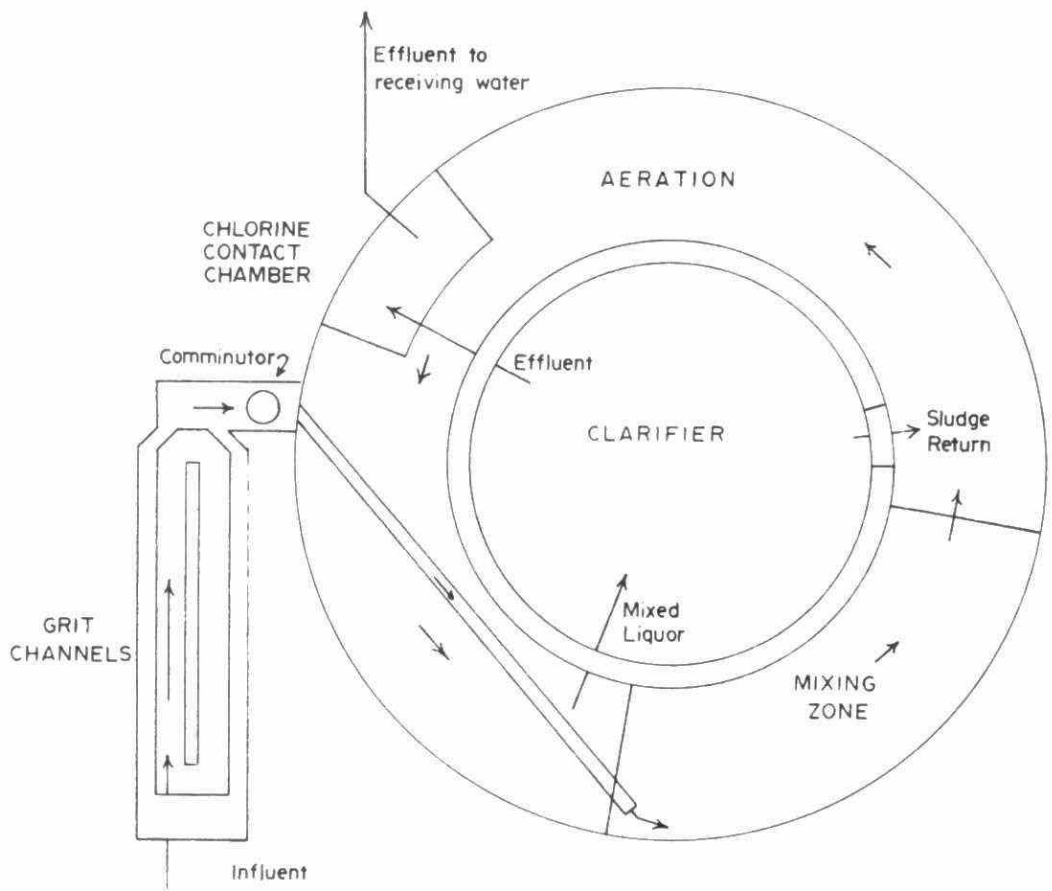
Type: Chicago Pump
Size: Two 80 gpm

Pumping Station #3

Type: Chicago Pump
Size: One 80 gpm

IGNACE TWP.

WATER POLLUTION CONTROL PLANT



DESIGN DATA

Project No: 1-0060-67
Design Flow: 0.21 MIGD
Contact Stabilization
0.14 MIGD
Extended Aeration
Design Population: 2500
BOD: Raw Sewage - 285 lb/day

PRETREATMENT

PUMPING STATION:
Pumps: Two, Type: FLYGT CP3151
Size: 670 USGPM at 59' TDH

Bar Screen at pumping station inlet

GRIT CHANNELS:
Two, 25' x 2' x 2' swd
Volume: (each) 624 I. Gal.
Detention: (each) 4.2 min.

BIOLOGICAL TREATMENT (Extended Aeration)

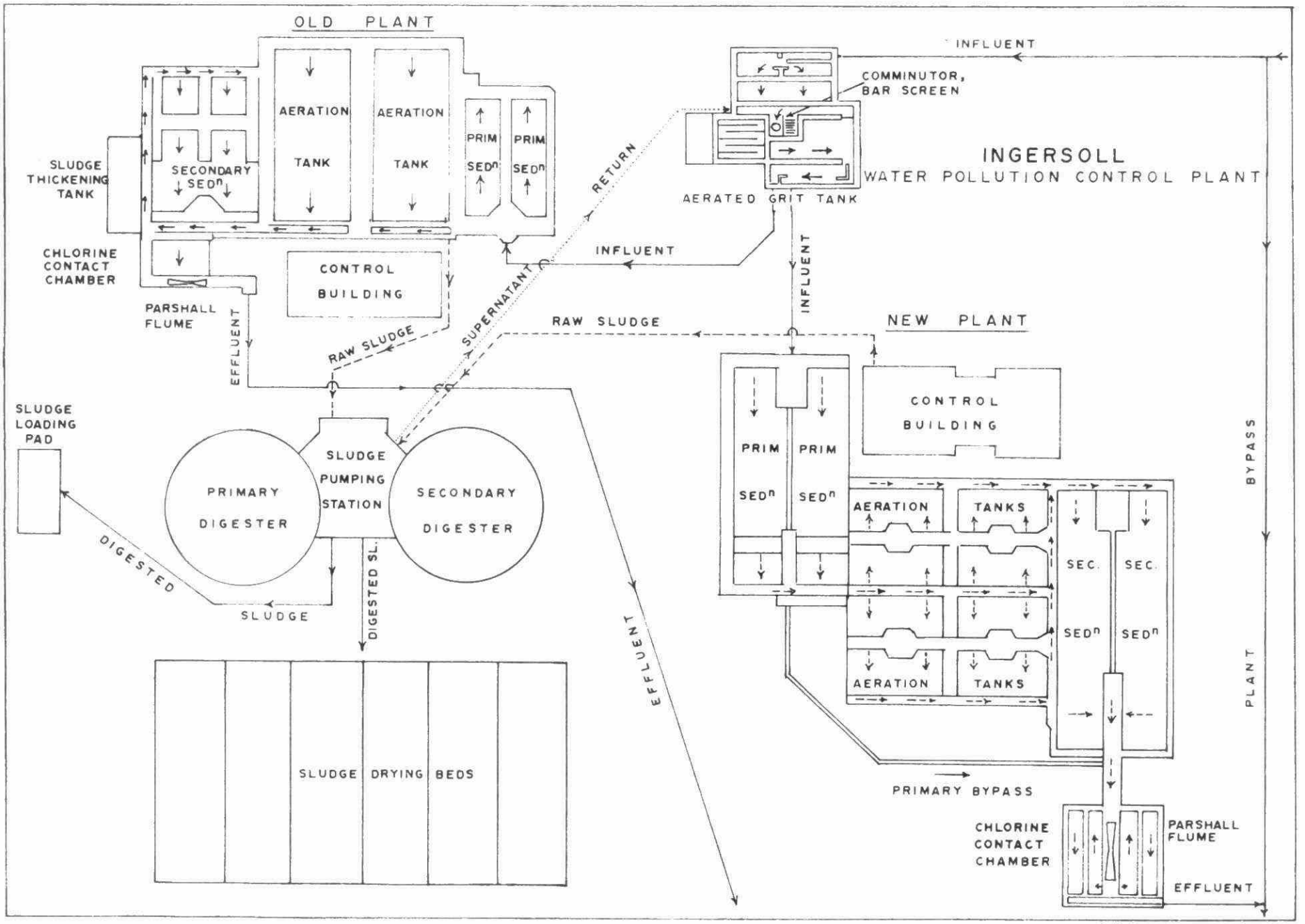
MIXING ZONE:
Volume: 26,000 I. Gal. Detention: 3.0 hours

AERATION ZONE:
Volume: 113,000 I. Gal.

Blowers, Two, Type: Roots Connersville RA188
Size: 590 cfm

SETTLING ZONE:
23'2" dia. x 12.6" awd
Volume: 37,000 I. Gal. Detention: 4.2 hours
Overflow Rate: 500 I. Gal/ft^2/day

CHLORINE CONTACT ZONE:
Volume: 4300 I. Gal. Detention: 29 min.


OLD PLANT
INFLUENT
COMMINUTOR, BAR SCREEN
INGERSOLL
WATER POLLUTION CONTROL PLANT
AERATED GRIT TANK
AERATION TANK
AERATION TANK
PRIM SEDⁿ
PRIM SEDⁿ
SECONDARY SEDⁿ
SLUDGE THICKENING TANK
CHLORINE CONTACT CHAMBER
PARSHALL FLUME
CONTROL BUILDING
RETURN
INFLUENT
INFLUENT
SUPERNATANT
EFFLUENT
RAW SLUDGE
RAW SLUDGE
NEW PLANT
SLUDGE LOADING PAD
PRIMARY DIGESTER
SLUDGE PUMPING STATION
SECONDARY DIGESTER
DIGESTED SLUDGE
DIGESTED SL.
SLUDGE DRYING BEDS
EFFLUENT
PRIM SEDⁿ
PRIM SEDⁿ
CONTROL BUILDING
AERATION TANKS
AERATION TANKS
SEC. SEDⁿ
SEC. SEDⁿ
BYPASS
PLANT
PRIMARY BYPASS
CHLORINE CONTACT CHAMBER
PARSHALL FLUME
EFFLUENT

DESIGN DATA

Project No:	1-0076-67
Treatment:	Conventional Activated Sludge
Design Flow:	2.25 MGD (Old Plant 0.75 MGD - New plant 1.5 MGD)
BOD:	Raw sewage 200 mg/l
SS:	Raw sewage 200 mg/l

PRETREATMENT (Common)

BAR SCREENS:
Manually cleaned, in wet well influent channel

RAW SEWAGE PUMPING:
Two, size 1120 USGPM
Two, size 2240 USGPM

COMMINUTION:
One comminutor, Capacity 6.75 MGD

GRIT REMOVAL:
Aerated grit tank
Size: 11'8" x 14' x 10' awd
Volume: 10500 I. Gal. Detention: 1.8 min.

OLD PLANT

PRIMARY SEDIMENTATION:
Two, each 12' x 40' x 10' swd (avg)
Volume: 60,000 I. Gal. Detention: 1.9 hours
Overflow rate: 780 I. Gal/day/sq. ft.

AERATION TANKS:
Two, each 30' x 54' x 15' swd (avg)
Volume: 300,000 I. Gal. Detention: 9.7 hours
Fine bubble diffusion
Blowers: Two, size: each 764 cfm at 7.5 psi

SECONDARY SEDIMENTATION:
Two, 15' x 45' x 12' swd (avg)
Volume: 100,000 I. Gal. Detention: 3.2 hours
Overflow rate: 550 gal/day/sq. ft.

CHLORINE CONTACT CHAMBER:
Size: 18' x 12' x 11' swd
Volume: 13,000 I. Gal. Detention: 25 min.

SLUDGE HOLDING TANK:
Size : 11' x 25' x 12'6" swd
Volume: 22,000 I. Gal.

NEW PLANT

PRIMARY SEDIMENTATION:

Two, 16' x 65' x 11' swd (avg)
Volume: 142,000 I. Gal.
Detention: 2.3 hours
Overflow rate: 720 I. gal/ft^2/day

AERATION TANKS:
Two, each with two cells 30' square x 13' swd
Volume: 270,000 I. Gal.
Detention: 4.3 hours

SECONDARY SEDIMENTATION:
Two, each 16' x 78' x 12' swd
Volume: 187,000 I. Gal.
Detention: 3 hours
Overflow rate: 600 I. Gal/ft^2/day

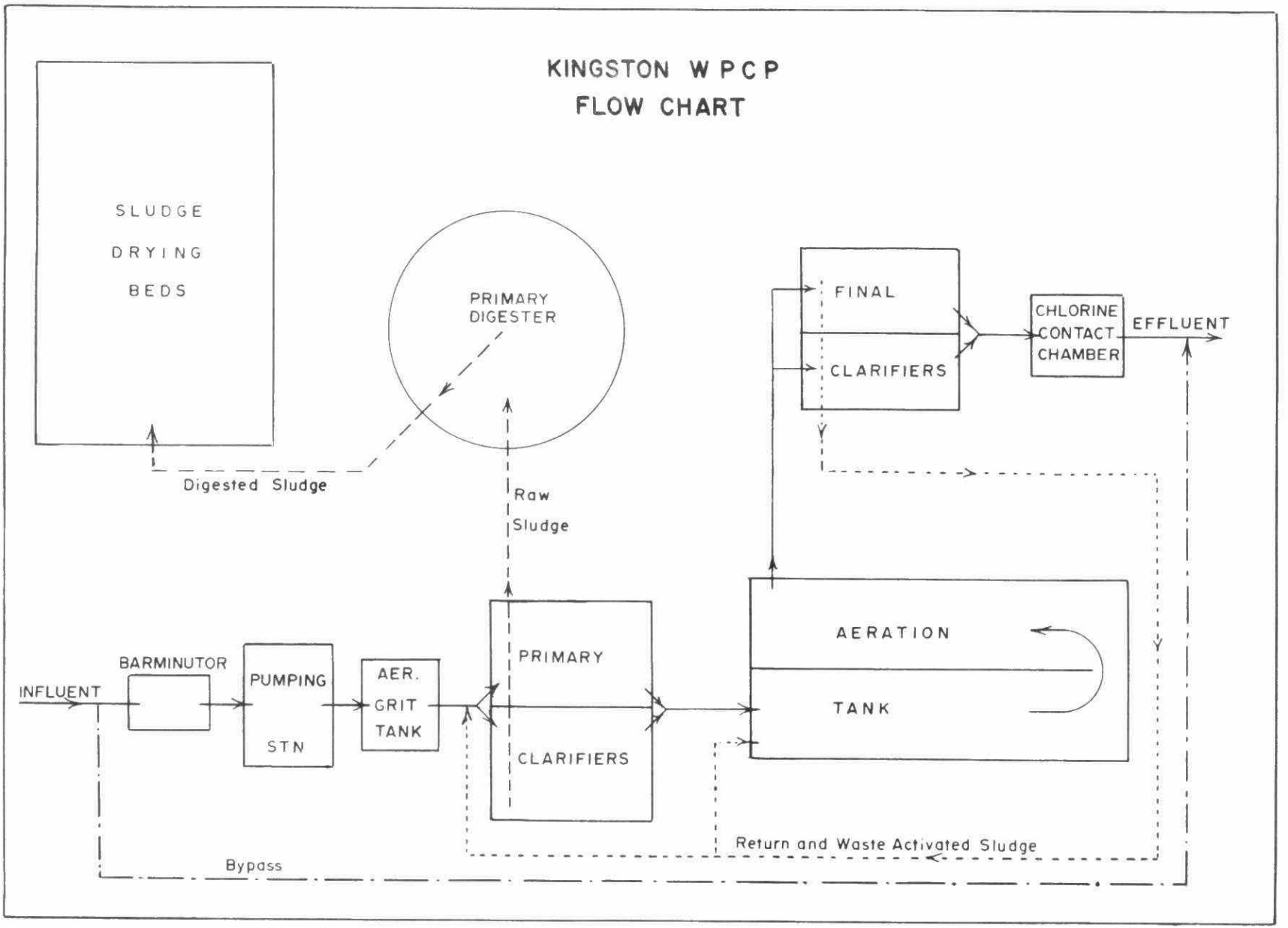
CHLORINE CONTACT CHAMBER:
Size: 26'6" x 24' x 10'3" swd
Volume: 41000 I. Gal.
Detention: 35 min.

SLUDGE HANDLING (Common)

PRIMARY DIGESTER:
Size 45' dia. x 21'3" swd
Volume: 36,000 ft^3.

SECONDARY DIGESTER:
Size: 45' dia. x 20'3" swd
Volume: 35,000 ft^3

SLUDGE DRYING BEDS:
Six, each 20' x 75'
Area: 9000 ft^2.


KINGSTON W P C P
FLOW CHART
SLUDGE
DRYING
BEDS
PRIMARY
DIGESTER
FINAL
CLARIFIERS
CHLORINE
CONTACT
CHAMBER
EFFLUENT
Digested Sludge
Raw
Sludge
INFLUENT
BARMINUTOR
PUMPING
STN
AER.
GRIT
TANK
PRIMARY
CLARIFIERS
AERATION
TANK
Return and Waste Activated Sludge
Bypass

DESIGN DATA

PROJECT NO.	2-0098-61
TREATMENT	Activated Sludge
DESIGN FLOW	0.83 mgd
DESIGN POPULATION	10,000
BOD - Raw Sewage	210 mg/l
SS - - Raw Sewage	250 mg/l

PRIMARY TREATMENT

Comminution

Type: C.P. Barminutor
Size: One Model C (18")

Sewage Lift Pumps

Type: Weinman Type VBM
Size: Two 1200 gpm @ 35' tdh

Grit Removal

Type: Aerated; grit removed by air lift
Size: 1920 gal
Retention: 2 min

Primary Sedimentation

Type: Falk
Size: Two 46' x 12' x 7'7" deep (8,380 cu ft or 52,200 gal)
Retention: 1.5 hours
Loading: Surface, 750 gal/ft^2/day
Weir, 8,600 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; Two-pass
Size: One tank 62' x 22.5' x 15' (each pass) (41,900 cu ft or 262,000 gal)
Retention: 7.6 hours

Air Supply

Type: Roots-Connersville
Size: Two 880 scfm

Diffusers

Type: C.P. Discfuser
Space: 63 diffusers per pass (wide band)

Secondary Sedimentation

Type: Falk
Size: Two 56' x 12' x 9' deep (12,100 cu ft or 75,600 gal)
Retention: 2.2 hours
Loading: Surface, 562 gal/ft^2/day
Weir, 5,050 gal/ft/day

CHLORINATION

One W & T (100 lb/day)

Chlorine Contact Chamber

Size: One 27' 9" x 9' x 8' deep (10,300 gal)
Retention: 18 min

OUTFALL

3,000 ft to Lake Ontario

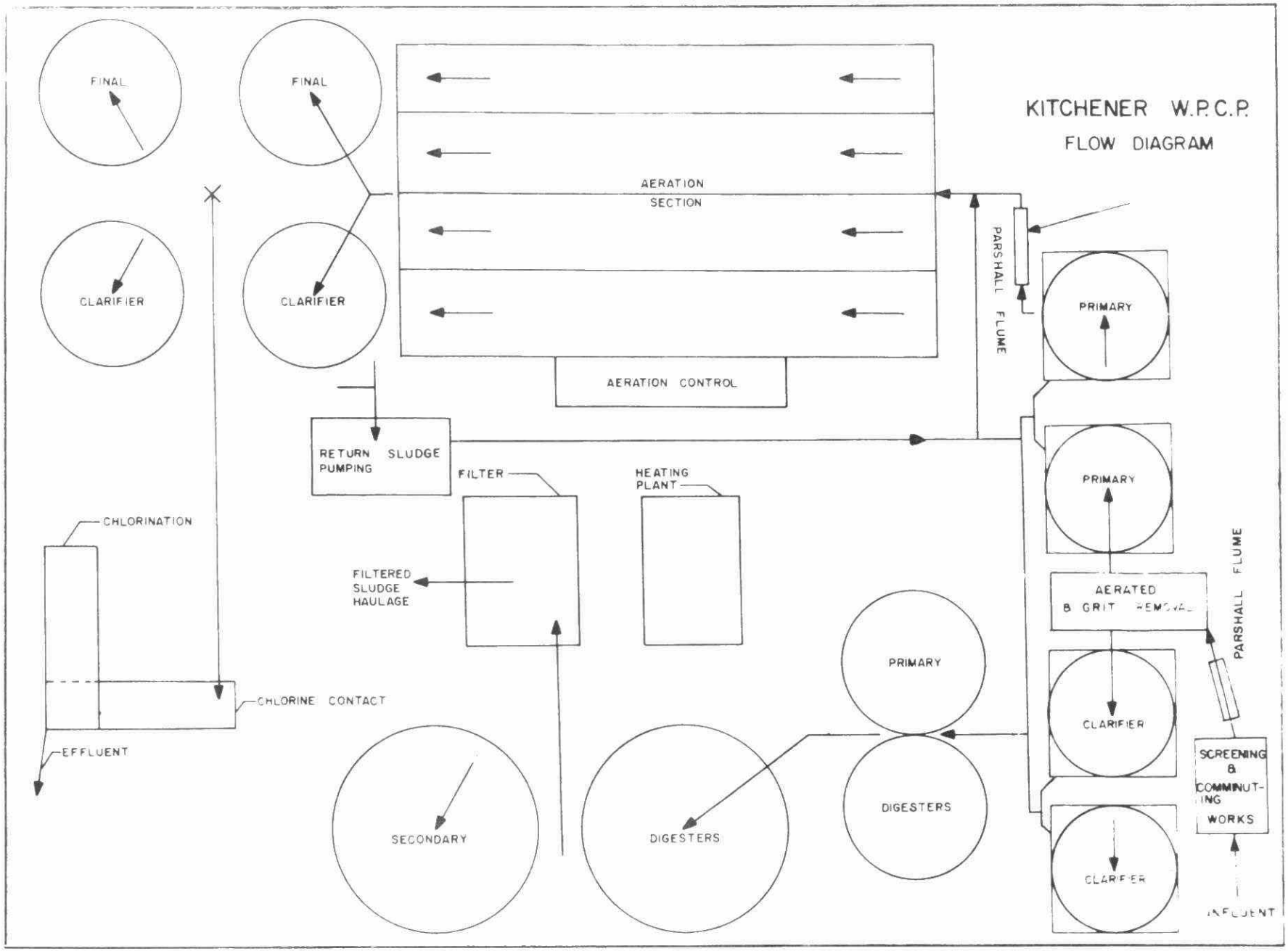
SLUDGE HANDLING

Digestion System

Type: Single stage, mixed by sludge recirculation
Size: One 55' dia x 20' swd (54,500 cu ft or 340,000 gal)
Loading: 0.57 lb/cu ft/mo
Recirculation pump - one Weinman: 150 gpm @ 65'

Sludge Drying Beds

Four 80' x 20' (6,400 sq ft)


KITCHENER W.P.C.P.
FLOW DIAGRAM
FINAL
FINAL
CLARIFIER
CLARIFIER
AERATION
SECTION
AERATION CONTROL
PARSHALL FLUME
PRIMARY
PRIMARY
RETURN SLUDGE
PUMPING
FILTER
HEATING
PLANT
CHLORINATION
FILTERED
SLUDGE
HAULAGE
AERATED
& GRIT REMOVAL
PARSHALL FLUME
PRIMARY
CLARIFIER
CHLORINE CONTACT
EFFLUENT
SCREENING
&
COMMINUT-
ING
WORKS
SECONDARY
DIGESTERS
DIGESTERS
CLARIFIER
INFLUENT

DESIGN DATA

PROJECT NO.	2-0019-58
TREATMENT	Activated Sludge
DESIGN FLOW	11.0 mgd (Prim) 13.5 mgd (Sec)
DESIGN POPULATION	100,000
BOD - Raw Sewage	300 mg/l
- Removal	95%
SS - Raw Sewage	450 mg/l
- Removal	95%

PRIMARY TREATMENT

Screening

- Manually cleaned bar screen with 4" spacing

Comminution

- One Worthington comminutor

Grit Removal

Type: Aerated; grit removed by air lift
Size: Two 11' x 10' x 10.5' deep (13,700 gal)
Retention: 1.7 min

Air Supply

- Two Sutorbilt blowers

Primary Sedimentation

Type: Dorr
Size: Four 60' x 60' x 11' 8" swd (1.01 mil gal)
Retention: 2.2 hours
Loading: Surface, 765 gal/ft2/day
Weir, 26,200 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration, serpentine flow (14 cells/tank)
Size: Four 210' x 60' x 13' 3" (680,000 cu ft or 4.2 mil gal)
Retention: 7.5 hours

Aerators

Type: Ames Crosta (56)

Secondary Sedimentation

Type: Dorr
Size: Four 80' dia x 10' swd (1.35 mil gal)
Retention: 2.4 hours
Loading: Surface, 672 gal/ft^2/day
Weir, 13,400 gal/ft/day

CHLORINATION

Type: BIF with evaporator
Size: One 2000 lb/day
One 600 lb/day

Chlorine Contact Chamber

Size: (141,000 gal)
Retention: 15 min

OUTFALL

- to Grand River

SLUDGE HANDLING

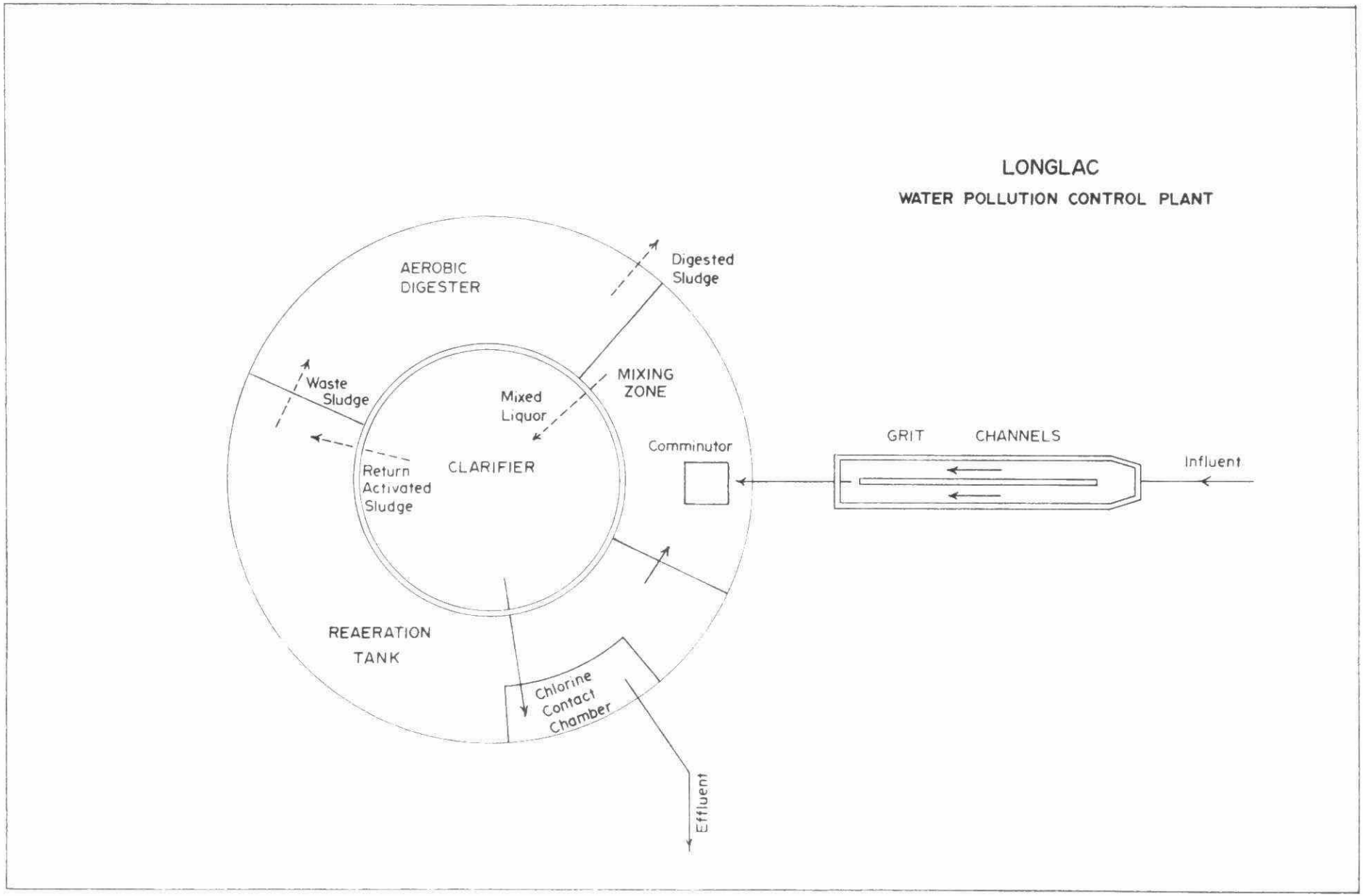
Digestion System - Two-stage

Primary --
Type: Dorr, single mixer
Size: Two 65' dia x 22' swd (144,000 cu ft or 0.90 mil gal)
Loading: 1.08 lb/cu ft/day

Secondary --
Type: Dorr, floating cover
Size: Two 100' dia x 29' swd (400,000 cu ft or 2.5 mil gal)
Total Loading: 0.29 lb/cu ft/mo

Vacuum Filter

Type: Komline - Sanderson
Size: One 500 sq ft


LONGLAC
WATER POLLUTION CONTROL PLANT
AEROBIC DIGESTER
Digested Sludge
Waste Sludge
Mixed Liquor
MIXING ZONE
Return Activated Sludge
CLARIFIER
Comminutor
GRIT CHANNELS
Influent
REAERATION TANK
Chlorine Contact Chamber
Effluent

DESIGN DATA

Project No: 1-0014-66
Treatment: Contact Stabilization
Design Flow: 0.21 MIGD
BOD: Raw Sewage 425 lb. BOD/day

PRETREATMENT

GRIT CHANNELS:
Two, each 21' x 1.5' x 2' swd
Volume (each): 393 I. Gal.
Detention (each) 2.7 min.

COMMINUTOR:
Type: A 10R

BIOLOGICAL TREATMENT

MIXING TANK:
Volume: 26,000 I. Gal. Detention: 3 hours

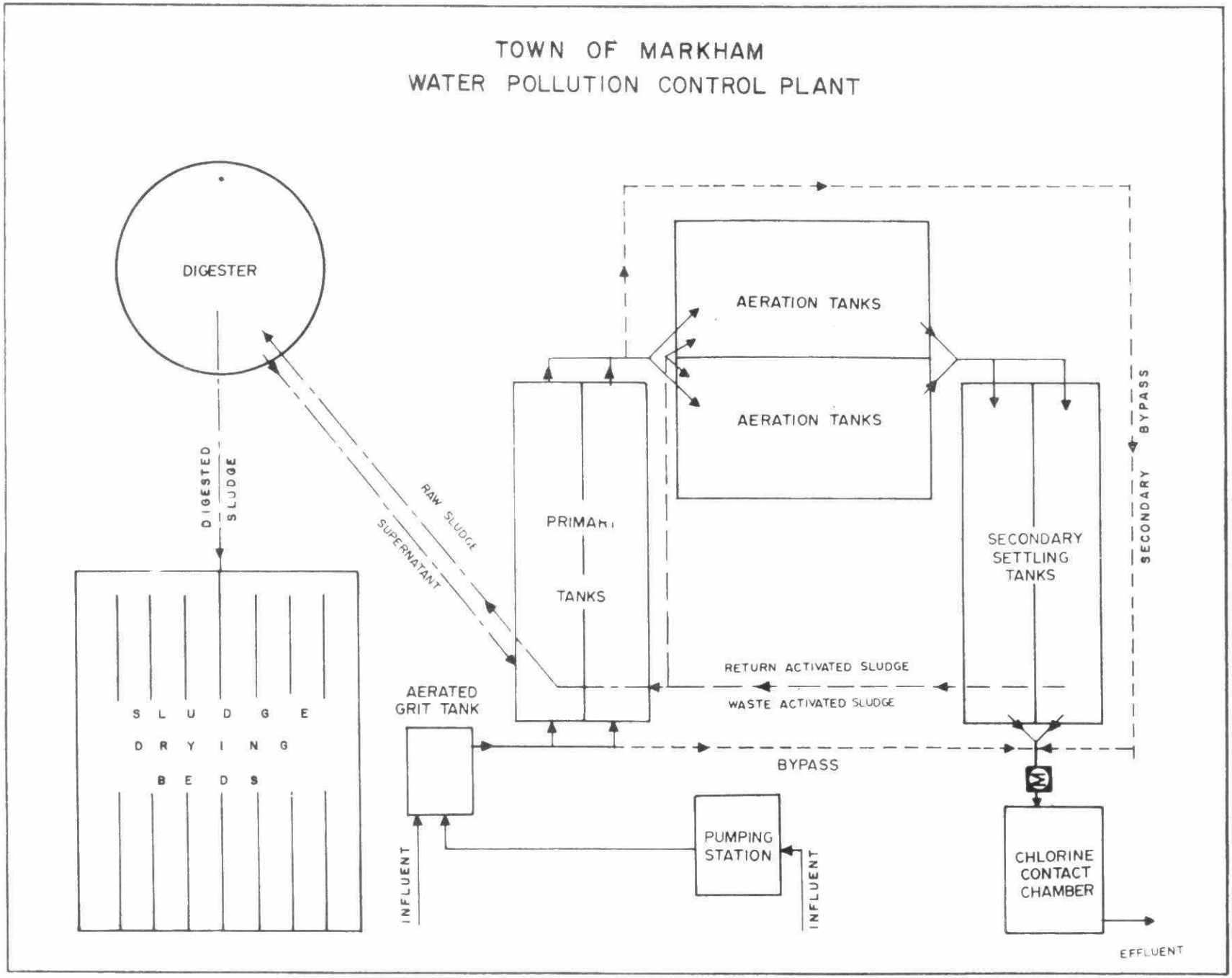
SETTLING TANK
Volume: 37,000 I. Gal. Detention: 4.2 hours
Overflow Rate: 577 I. Gal/ft^2/day

REAERATION TANK:
Volume: 66,000 I. Gal.

Blowers: Two Type: SUTORBILT 8HB
Size: 590 cfm at 9 psi

AEROBIC DIGESTER:
Volume: 46,800 I. Gal.

CHLORINE CONTACT CHAMBER:
Volume: 4300 I. Gal.
Detention: 30 min.


TOWN OF MARKHAM
WATER POLLUTION CONTROL PLANT
DIGESTER
DIGESTED SLUDGE
RAW SLUDGE
SUPERNATANT
AERATION TANKS
AERATION TANKS
PRIMARY TANKS
SECONDARY SETTLING TANKS
SECONDARY BYPASS
RETURN ACTIVATED SLUDGE
WASTE ACTIVATED SLUDGE
AERATED GRIT TANK
BYPASS
SLUDGE DRYING BEDS
PUMPING STATION
INFLUENT
INFLUENT
CHLORINE CONTACT CHAMBER
EFFLUENT

DESIGN DATA

PROJECT NO.	2-0040-59
TREATMENT	Activated Sludge
DESIGN FLOW	0.67 mgd
DESIGN POPULATION	8,000
BOD - Raw Sewage	215 mg/l
- Removal	95%
SS - Raw Sewage	220 mg/l
- Removal	95%

PUMPING STATION

Type: Fairbanks-Morse
Size: Two 350 gpm @ 40' tdh

PRIMARY TREATMENT

Comminution

Type: C.P. Barminutor
Size: One 18"

Grit Removal

Type: Aerated
Size: One 13' x 6' x 8.1' swd (4,240 gal)
Retention: 9.2 min

Primary Sedimentation

Type: Jeffrey
Size: Two 42' x 12' x 7' 9" (avg) (48,800 gal)
Retention: 1.76 hours
Loading: Surface, 660 gal/ft^2/day
Weir, 27,800 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, two pass
Size: One 51'x22'x15' plus one 51'x28'x15' (38,250 cu. ft. or 239,000 gallons

Air Supply

Type: Sutorbilt and Aerzen
Size: One 700 scfm @ 5 psi (standby)
One 1075 scfm

Diffusers

- 72 spargers (17" centre)

Secondary Sedimentation

Type: Jeffrey
Size: Two 42' x 12' x 10.5' (avg) (66,000 gal)
Retention: 2.38 hours
Loading: Surface, 660 gal/ft^2/day
Weir, 4,750 gal/ft/day

CHLORINATION

Type: W & T
Size: One 70 lb/day

Chlorine Contact Chamber

Size: 20' x 11.38' x 8.5' swd (12,080 gal)
Retention: 26 min

OUTFALL

- to Exhibition Creek (tributary of Rouge River)

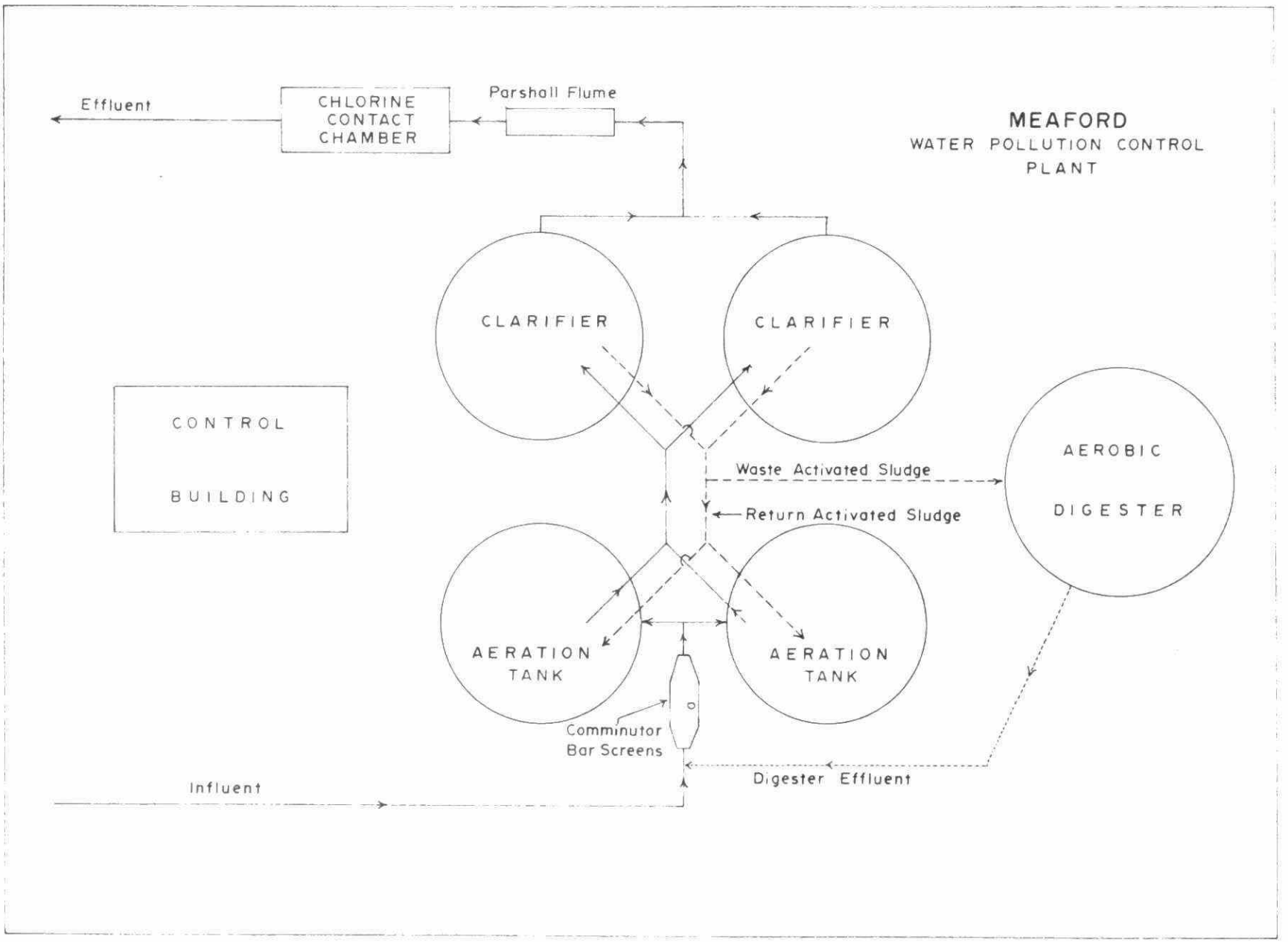
SLUDGE HANDLING

Digestion System - Single-stage

Type: Mixed by recirculation
Size: One 45' dia x 20' swd (34,240 cu ft or 220,000 gal)
Loading: 0.67 lb/cu ft/ mo

Sludge Drying Beds

Size: Four 90' x 20' (7,200 sq ft)


MEAFORD
WATER POLLUTION CONTROL PLANT
Effluent
CHLORINE CONTACT CHAMBER
Parshall Flume
CLARIFIER
CLARIFIER
CONTROL BUILDING
AEROBIC DIGESTER
Waste Activated Sludge
Return Activated Sludge
AERATION TANK
AERATION TANK
Comminutor Bar Screens
Digester Effluent
Influent

DESIGN DATA

PROJECT NO.	1-0003-66
TREATMENT	Activated Sludge
DESIGN FLOW	0.86 mgd

COMMINUTOR

Type: Condux type 400
Max. Capacity - 2.58 migd

AERATION TANKS

2 tanks, each 30'0" dia x 19'3" swd
Capacity: 170,000 I.G. total
Detention: 4.7 hours

Aerators

Type: 2 mechanical Ames-Crosta
driven by 50 hp electric motors

SECONDARY CLARIFIER

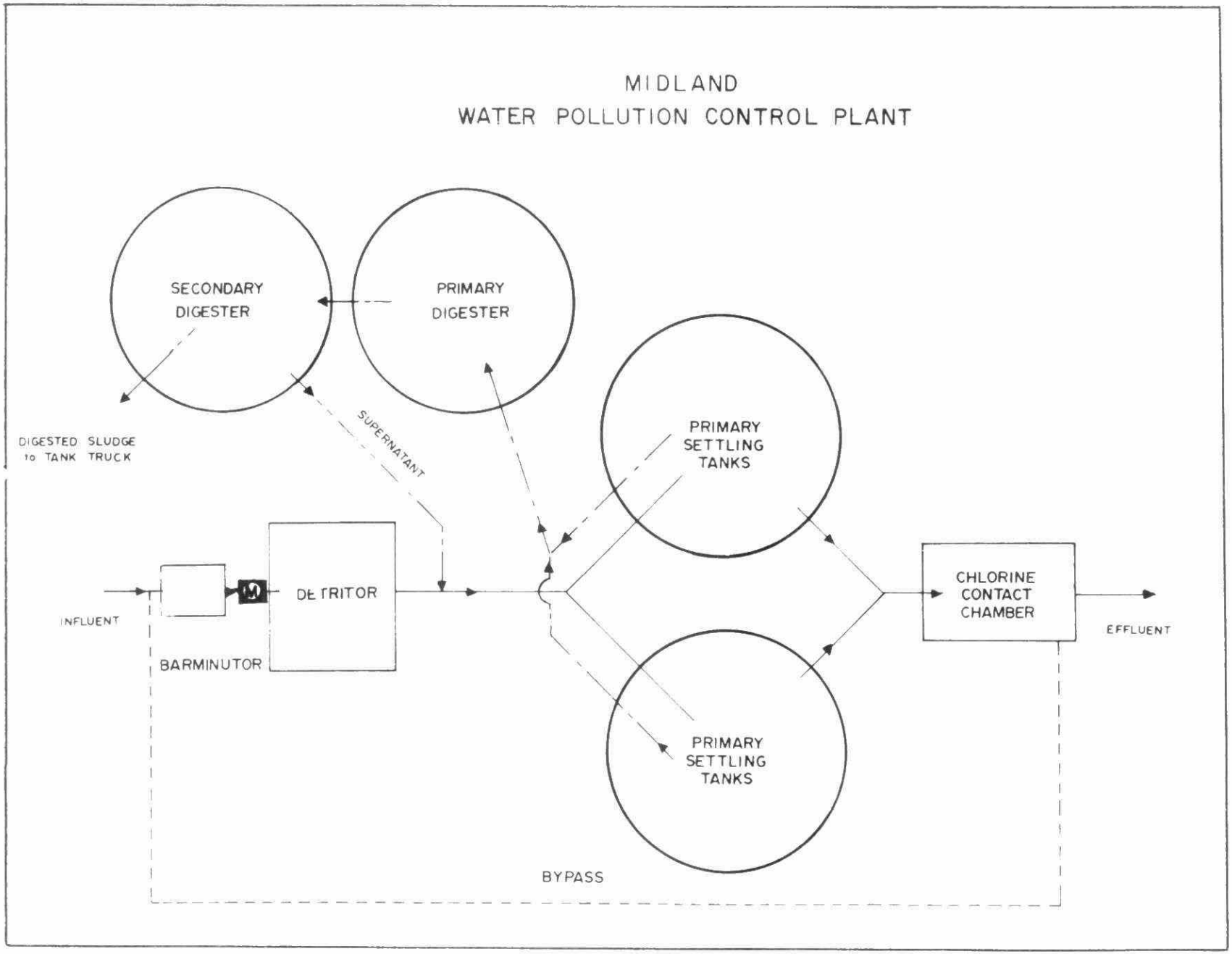
2 clarifiers 40'0" dia x 10'9" avg. swd
Capacity: 168,000 I.G. total
Detention: 4.7 hours
Loading: Surface 340 gal/ft^2/day
Return Sludge Pumps: 2, 720 IGPM
@ 30' tdh

CHLORINE CONTACT CHAMBER

Size: 24' x 8' x 6' 6", 8400 gallons
Detention Time: 14 min.

AEROBIC DIGESTER

Dimensions: 50'0" dia x 18'6" avg swd.
Capacity: 227,000 I.G.
Aerator: 1 at 50 rpm


MIDLAND
WATER POLLUTION CONTROL PLANT
SECONDARY DIGESTER
PRIMARY DIGESTER
DIGESTED SLUDGE to TANK TRUCK
SUPERNATANT
PRIMARY SETTLING TANKS
INFLUENT
DETRITOR
BARMINUTOR
CHLORINE CONTACT CHAMBER
EFFLUENT
PRIMARY SETTLING TANKS
BYPASS

DESIGN DATA

PROJECT NO.	2-0146-63
TREATMENT	Primary
DESIGN FLOW	1.25 mgd
DESIGN POPULATION	12,500
BOD - Raw Sewage	225 mg/l
- Removal	40%
SS - Raw Sewage	300 mg/l
- Removal	60%

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: One Model C

Grit Removal

Type: Dorr Detritor
Size: One 12' x 12' x 16" (1,200 gal)
Retention: 1.38 min

Primary Sedimentation

Type: Dorr
Size: Two 50' dia x 8' swd 195,000 gal)
Retention: 3.75 hours
Loading: Surface, 319 gal/ft^2/day
Weir, 3970 gal/ft/day

CHLORINATION

Type: W & T, Type A711 (Auto)
Size: One 1000 lb/day

Chlorine Contact Chamber

Size: Irregular (16,200 gal)
Retention: 18.7 min

OUTFALL

615' of 24" pipe to Georgian Bay

SLUDGE HANDLING

Digestion System - Two Stage

Primary --
Type: Babcock-Wilson Draft tube mixers (2)
Size: One 30' dia x 22' (15,600 cu ft or 97,200 gal)
Loading: 4.3 lb/cu ft/mo

Secondary --
Type: Fixed steel cover
Size: One 30' dia x 21½' (15,200 cu ft or 94,600 gal)
Total Loading: 2.2 lb/cu ft/mo

PUMPING STATIONS

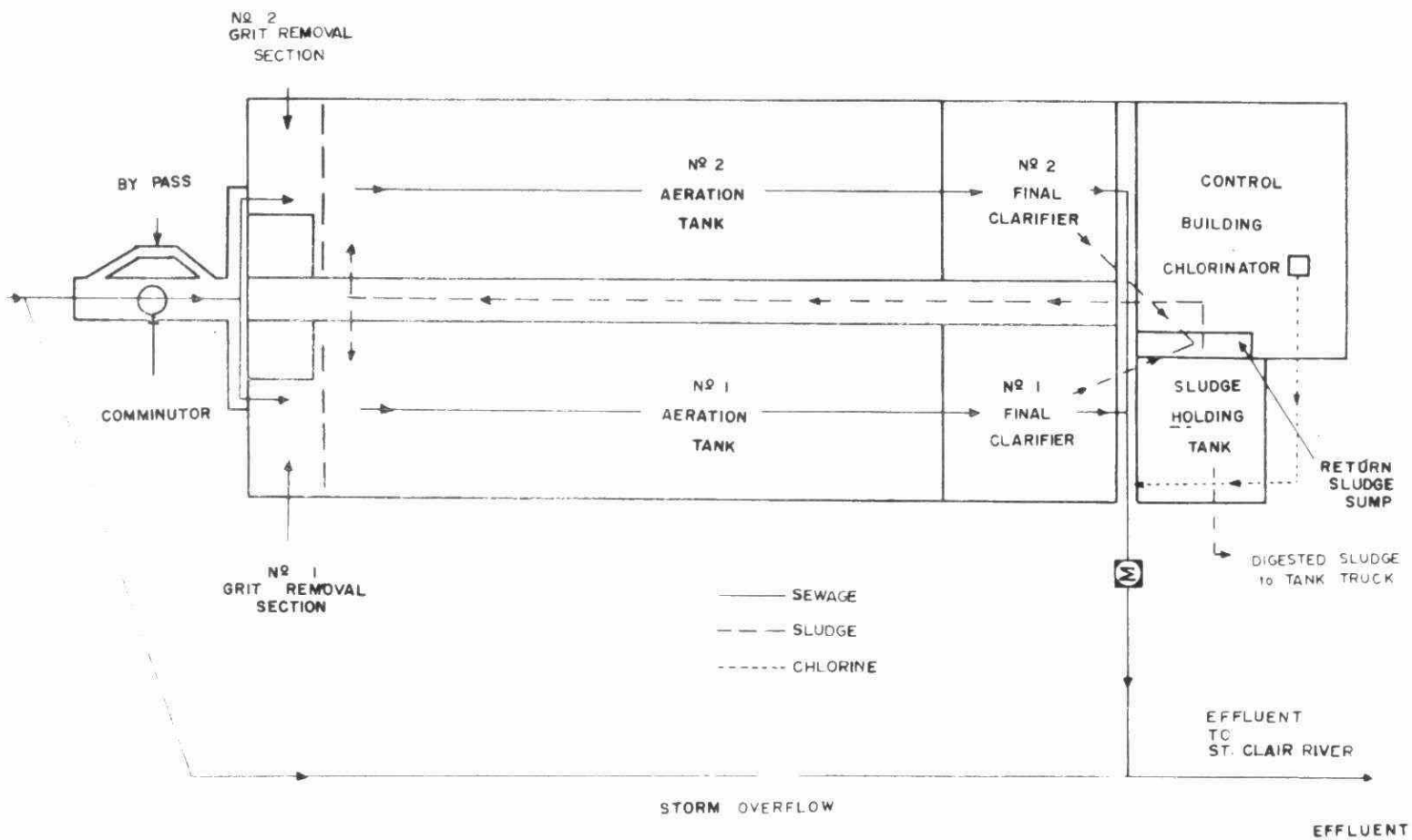
#1 Pumping Station

Type: Worthington
Size: Two 780 gpm @ 37' tdh
One 2600 gpm @ 60' tdh

#2 Pumping Station

Type: Flygt (submersible)
Size: Two 83 gpm @ 30' tdh

MOORE TOWNSHIP (CORUNNA)
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.	2-0088-61
TREATMENT	Extended Aeration
DESIGN FLOW	0.32 mgd
DESIGN POPULATION	4,000
BOD - Raw Sewage	150 mg/l
- Removal	90-95%
SS - Raw Sewage	150 mg/l
- Removal	90-95%

PRETREATMENT

Comminution

Type: Worthington comminutor
Size: One Model 15-C-4

Grit Removal

Type: C.P. Aer-Degritter with air lift
Size: 3780 gal
Retention: 17 min

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Single pass
Size: Two 84' x 17' x 14.25' (avg)
(40,698 cu ft or 254,000 gal)
Retention: 24.0 hours

Air Supply

Type: Sutorbilt
Size: Two 1000 cfm

Diffusers

Type: C.P. Spargers
Spacing: 22 per tank @ 20" c-c

Secondary Sedimentation

Type: Dorr
Size: Two 22' x 22' x 12½' swd
(75,300 gal)
Retention: 5.7 hours
Loading: Surface, 330 gal/ft^2/day
Weir, 2,350 gal/ft/day

CHLORINATION

Type: W & T, Manual
Size: One 100 lb/day

Chlorine Contact Chamber

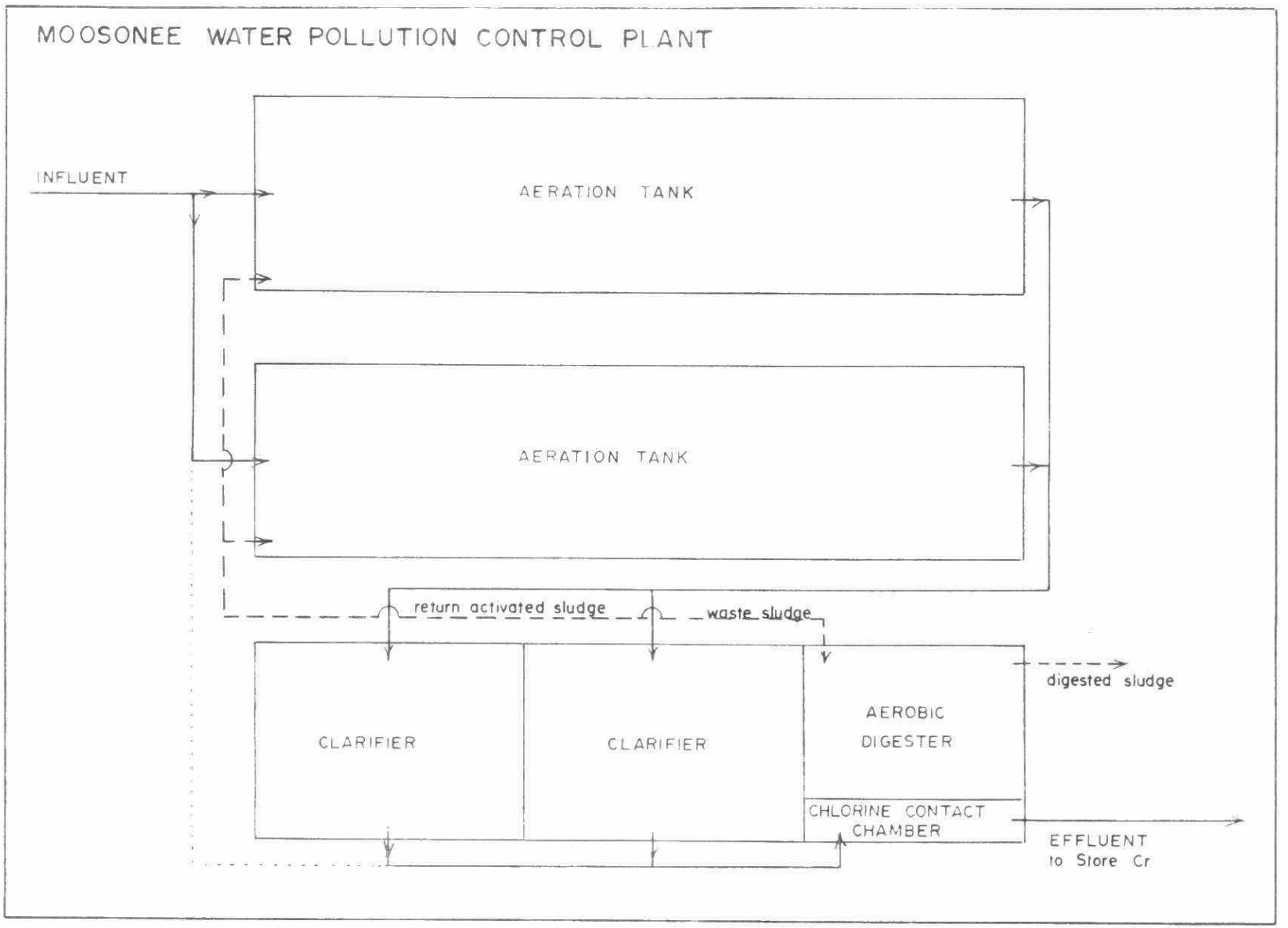
- in outfall

OUTFALL

196' of 48" dia corrugated pipe to St. Clair River

SLUDGE HANDLING

Type: Sludge holding tank (decanted)
Size: One 17' x 17' x 15' (23,000 gal @ 12.8' depth)


MOOSONEE WATER POLLUTION CONTROL PLANT
INFLUENT
AERATION TANK
AERATION TANK
return activated sludge
waste sludge
CLARIFIER
CLARIFIER
AEROBIC
DIGESTER
digested sludge
CHLORINE CONTACT
CHAMBER
EFFLUENT
to Store Cr

PROJECT NO.	1-0002-66
TREATMENT	Extended Aeration
DESIGN FLOW	75,000 I. gal/day
DESIGN POPULATION	1,000
BOD - Raw Sewage	254 mg/l
- Removal	90%
SS - Raw Sewage	286 mg/l
- Removal	85%

PRELIMINARY TREATMENT

Comminution

Type: Chicago Pump Model 7B

EXTENDED AERATION

Aeration Tanks

Type: Diffused air, single pass
Size: Two 45.6" x 11' x 12'
(12,000 ft^3 or 75,000 gal)
Retention: 24 hours

Air Supply

Type: Hoffman
Size: Two 312 cfm

Diffusers

Type: Shearfusers
Spacing: 22/tank @24" centres

Sedimentation

Type: Smith & Loveless
Size: Two (18,400 gal)
Retention: 5.9 hours
Loading: Surface, 204 gal/ft^2/day
Weirs, 2250 gal/ft/day

CHLORINATION

One W & T V-800 400'b/day

Chlorine Contact Chamber

Size: 2430 gal
Retention: 48 minutes

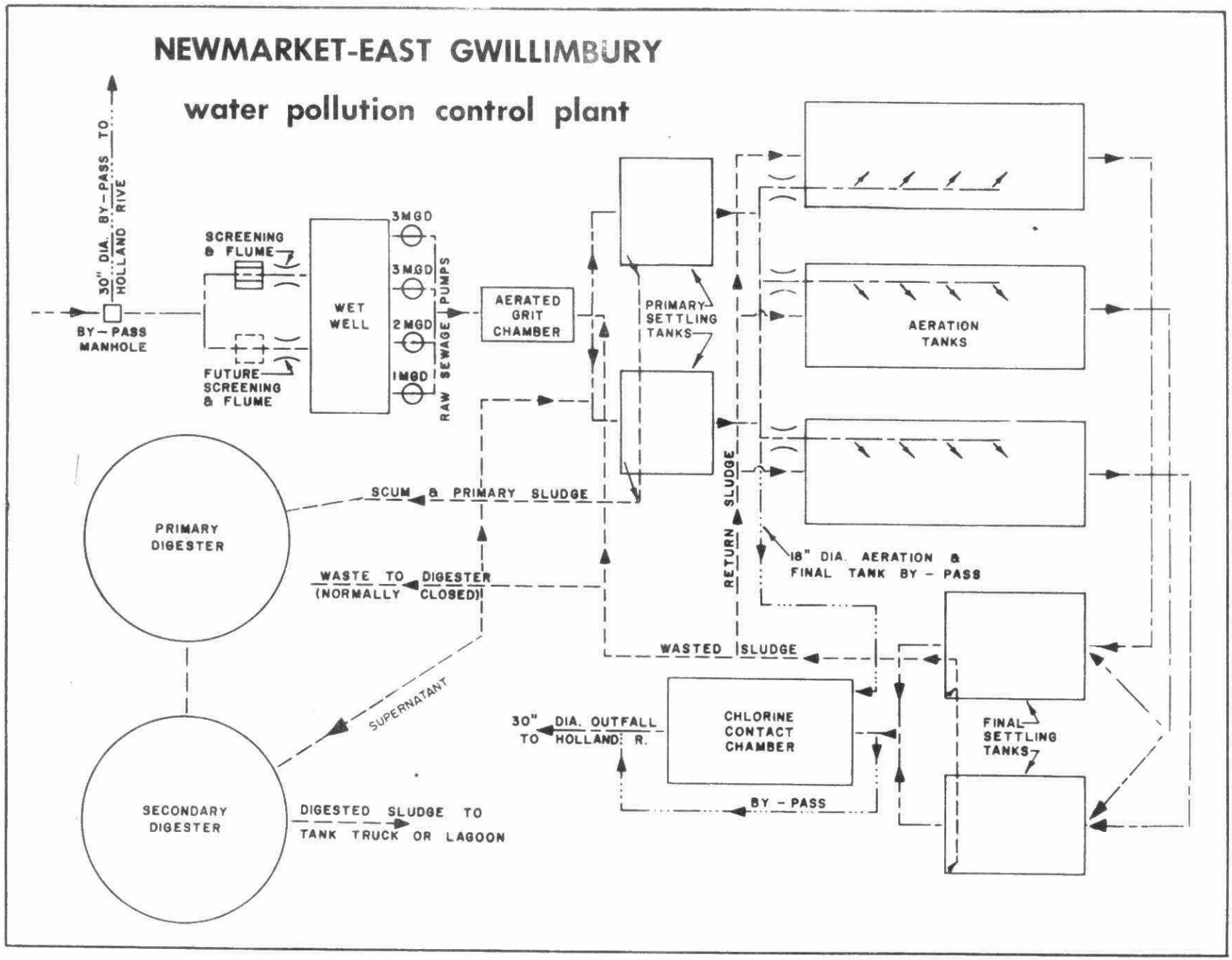
SLUDGE HANDLING

Digestion System - Aerobic

Size: 1140 ft^3 or 7100 gal
Air Supply: 50 cfm
Diffusers: 7 Shearfusers

OUTFALL

To Store Creek (at junction of Moose River)


NEWMARKET-EAST GWILLIMBURY
water pollution control plant
30" DIA. BY-PASS TO HOLLAND RIVE
BY - PASS MANHOLE
SCREENING & FLUME
FUTURE SCREENING & FLUME
WET WELL
3MGD
3MGD
2MGD
1MGD
RAW SEWAGE PUMPS
AERATED GRIT CHAMBER
PRIMARY SETTLING TANKS
AERATION TANKS
RETURN SLUDGE
18" DIA. AERATION & FINAL TANK BY - PASS
SCUM & PRIMARY SLUDGE
PRIMARY DIGESTER
WASTE TO DIGESTER (NORMALLY CLOSED)
WASTED SLUDGE
SUPERNATANT
30" DIA. OUTFALL TO HOLLAND R.
CHLORINE CONTACT CHAMBER
FINAL SETTLING TANKS
BY - PASS
SECONDARY DIGESTER
DIGESTED SLUDGE TO TANK TRUCK OR LAGOON

DESIGN DATA

PROJECT NO.	2-0087-61
TREATMENT	Activated Sludge
DESIGN FLOW	2.0 mgd
DESIGN POPULATION	
Newmarket	9,200
East Gwillimbury	10,000
BOD - Raw Sewage	220 mg/l
- Removal	90%
SS - Raw Sewage	212 mg/l
- Removal	90%

PRIMARY TREATMENT

Screening

in East Channel; 1" spacing

Raw Sewage Pumps

Type: Smart Turner
Size: Two 1875 gpm @ 30' tdh
One 1560 gpm @ 30' tdh
One 1000 gpm @ 30' tdh

Grit Removal

Type: Aerated, grit removed by air lift
Size: Two 14.3' x 6' x 8.1' swd
(9,700 gal)
Retention: 7 min
Air Supply: One Sutorbilt
130 scfm @ 8 psi

Primary Sedimentation

Type: Eimco
Size: Two 30' x 30' x 11.7' swd
(131,000 gal)
Retention: 1.57 hr
Loading: Surface, 1110 gal/ft^2/day
Weir, 10,800 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass
Size: Three 90' x 30' x 10.7'
(107,500 cu ft or 0.67 mil gal)

Aerators

Twelve Simcar

Secondary Sedimentation

Type: Eimco
Size: Two 35' x 35' x 13' swd
(197,000 gal)
Retention: 2.4 hr
Loading: Surface, 840 gal/ft^2/day
Weir, 7,870 gal/ft/day

CHLORINATION

Wallace & Tiernan

Chlorine Contact Chamber

Size: One 61.4' x 9' x 10.1'
(34,800 gal)
Retention: 25 min

OUTFALL

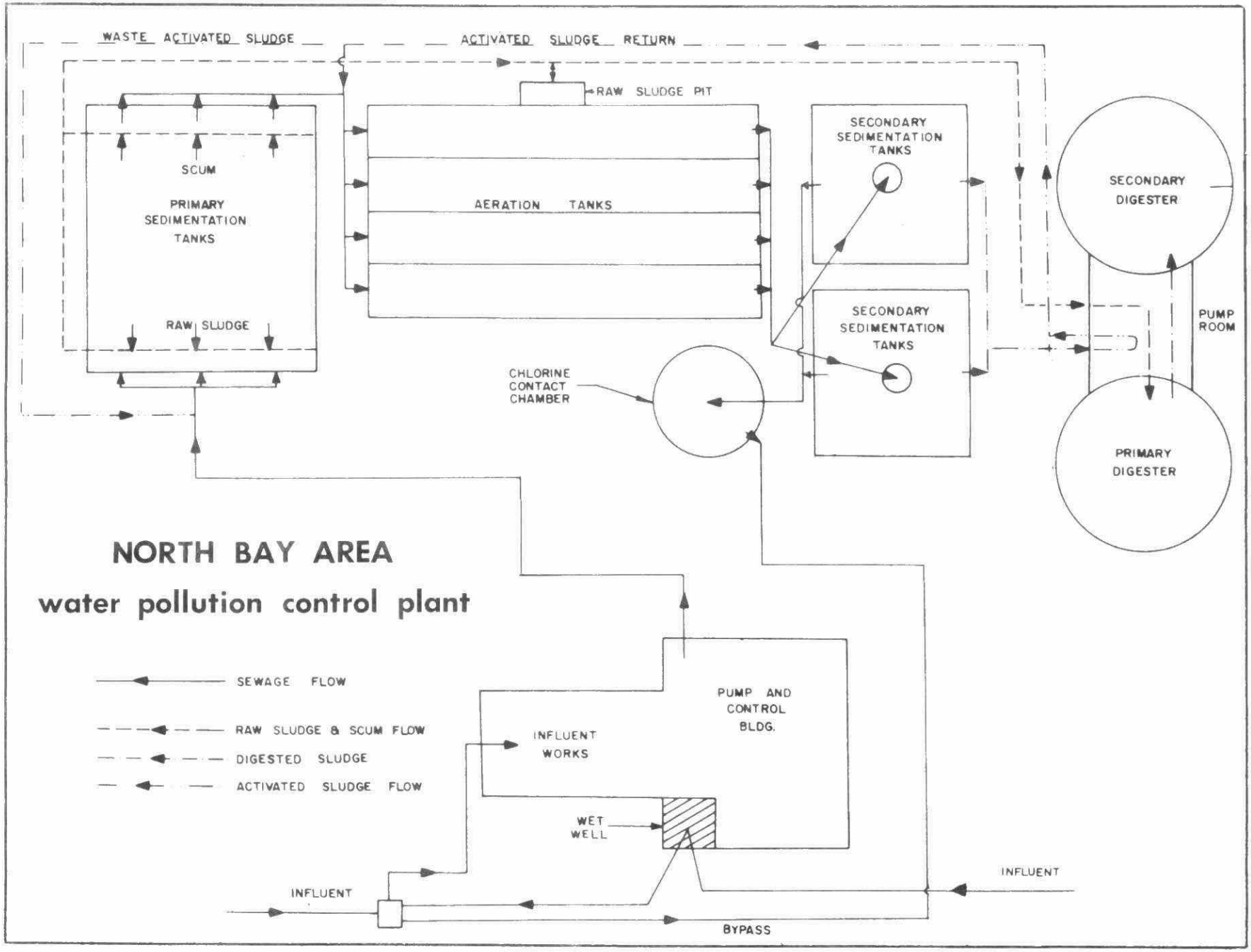
to Holland River

SLUDGE HANDLING

Digestion System - Two Stage

Primary --
Type: Gas mixed concrete
C.P. Lammert gas comp.
Size: One 40 dia x 21.25 swd
(26,800 cu ft or 0.167 mil gal)
Loading: 2.9 lb/cu ft/mo

Secondary --
Size: One 40; dia x 23' swd
(28,950 cu ft or 0.18 mil gal)
Total Loading: 1.4 lb/cu ft/mo


WASTE ACTIVATED SLUDGE
ACTIVATED SLUDGE RETURN
RAW SLUDGE PIT
SCUM
PRIMARY SEDIMENTATION TANKS
RAW SLUDGE
AERATION TANKS
SECONDARY SEDIMENTATION TANKS
SECONDARY SEDIMENTATION TANKS
SECONDARY DIGESTER
PUMP ROOM
PRIMARY DIGESTER
CHLORINE CONTACT CHAMBER
NORTH BAY AREA
water pollution control plant
SEWAGE FLOW
RAW SLUDGE & SCUM FLOW
DIGESTED SLUDGE
ACTIVATED SLUDGE FLOW
PUMP AND CONTROL BLDG.
INFLUENT WORKS
WET WELL
INFLUENT
INFLUENT
BYPASS

DESIGN DATA

PROJECT NO.	2-0010-58
TREATMENT	Activated Sludge
DESIGN FLOW	4.0 mgd
DESIGN POPULATION	50,000
BOD - Raw Sewage	150 mg/l
- Removal	85%

PRIMARY TREATMENT

Grit Removal

Type: Walker CRG
Size: Two $11\frac{1}{2}$ X $11\frac{1}{2}$ X 2'(3,300 gal)
Retention: 1.2 min
Flow Velocity: 0.163 fps

Comminution

- Two Griductors (Infilco)

Sewage Lift Pumps

Type: Chicago Pumps
Size: Two 4 mgd (gas)
One 4 mgd (electric)

Primary Sedimentation

Type: Hardinge
Size: Three 90 X 30 X 10'
(0.505 mil gal)
Retention: 3 hr
Loading: Surface, 500 gal/ft^2/day
Weir, 44,000 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single-pass
Size: Four 185 X 20 X 12'
(1.1 mil gal)
Retention: 6.4 hr
Loading: 4,200 lb BOD/day

Air Supply

Type: Roots
Size: Two 3750 cfm @ 7 psi

Diffusers

Type: Spargers
Spacing: 70 @ $22\frac{1}{2}$")
14 @ 155/8") per tank
32 @ $13\frac{1}{2}$")

Secondary Sedimentation

Type: Walker RSX
Size: Two 60 X 60 X 11' (500,000 gal)
Retention: 3 hrs
Loading: Surface, 550 gal/ft^2/day
Weir, 8,000 gal/ft/day

CHLORINATION

Type: BIF semi-automatic
Size: One 500 lb/day

Chlorine Contact Chamber

Size: One 34' dia x $12\frac{1}{2}$' (71,000 gal)
Retention: 25 min

OUTFALL

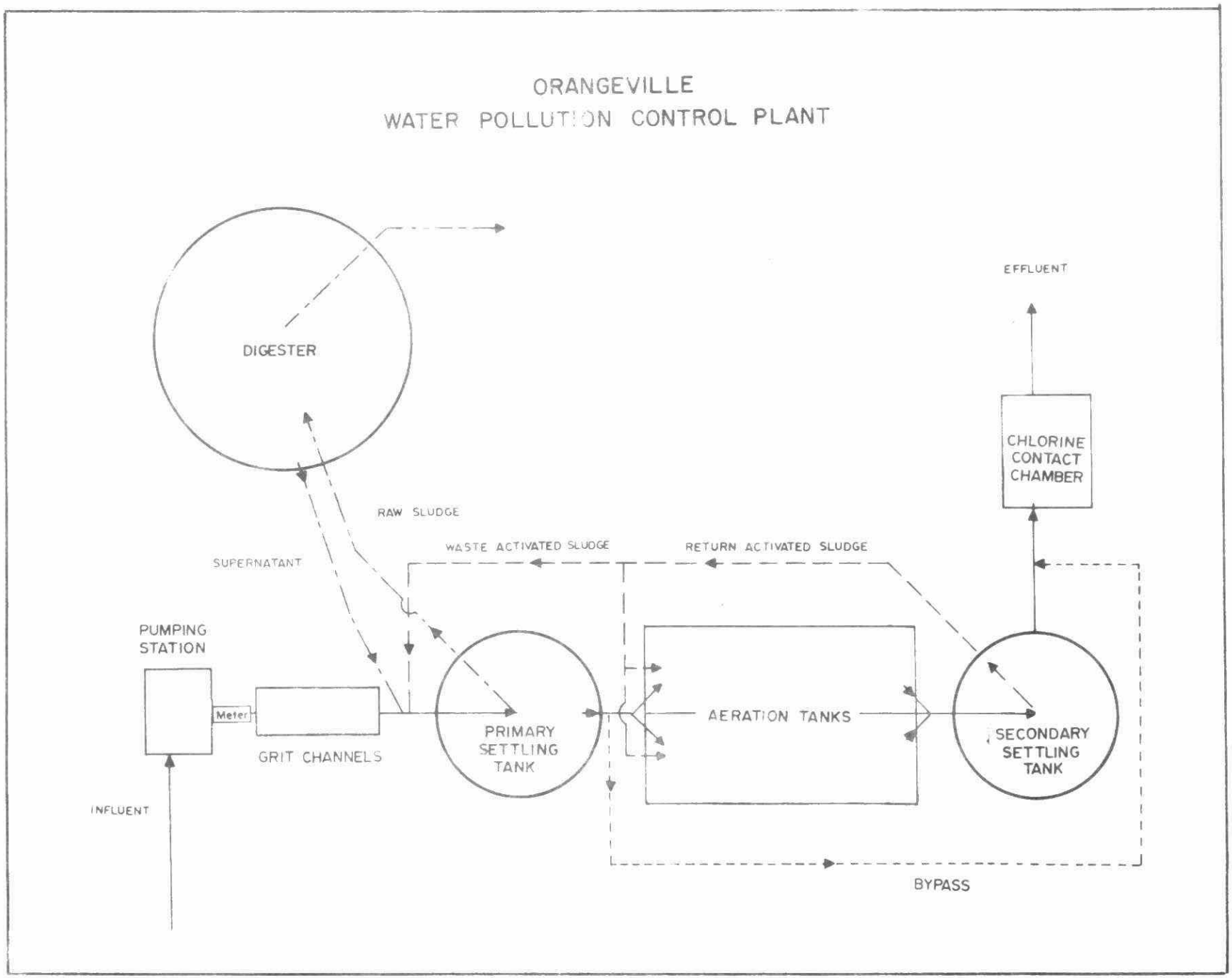
- 1000 ft into Lake Nippissing

SLUDGE HANDLING

Digestion System - Two-stage

Primary --
Type: Dorr (3 draft tube mixers)
Size: One 65' dia (70,000 cu ft or
0.436 mil gal)
Loading: 2.4 lb/cu ft/mo

Secondary --
Size: One 65' dia (74,000 cu ft or
0.46 mil gal)
Total Loading: 1.2 lb/cu ft/mo


ORANGEVILLE
WATER POLLUTION CONTROL PLANT
DIGESTER
EFFLUENT
CHLORINE CONTACT CHAMBER
RAW SLUDGE
WASTE ACTIVATED SLUDGE
RETURN ACTIVATED SLUDGE
SUPERNATANT
PUMPING STATION
Meter
GRIT CHANNELS
PRIMARY SETTLING TANK
AERATION TANKS
SECONDARY SETTLING TANK
INFLUENT
BYPASS

DESIGN DATA

PROJECT NO.	2-0208-66
TREATMENT	Activated Sludge
DESIGN FLOW	0.75 mgd
DESIGN POPULATION	7,500
BOD - Raw Sewage	200 mg/l
SS - Raw Sewage	250 mg/l

LIFT PUMPS

Type: Smart-Turner
Size: Two 300 gpm @ 20' tdh
One 500 gpm @ 25' tdh

PRIMARY TREATMENT

Grit Removal

Type: Channels, manually cleaned
Size: Two 25' x 1' 10 3/4" wide
Flow Velocity: 1 fps @ 0.366' depth

Primary Sedimentation

Type: Spiraflow (peripheral feed)
Size: One 35' dia x 12' swd
(72,000 gal)
Retention: 2.31 hr
Loading: Surface, 780 gal/ft^2/day
Weir, 7350 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffusee air; single-pass
Size: Two 63 x 21 x 12'
(198,000 gal)
Retention: 6.33 hr
Diffusers: Dorr Inka

Air Supply

Type: Powlesland-Bailey fan
Size: Two 3200 scfm @ 30" wc

Secondary Sedimentation

Type: Dorr
Size: One 45' dia x 9.17' swd
(97,300 gal)
Retention: 3.12 hrs
Loading: Surface, 470 gal/ft^2/day
Weir, 5820 gal/ft/day

CHLORINATION

Type: W & T
Size: One 75 lb/day

Chlorine Contact Chamber

Size: One 29.75 x 12 x 6.92'
(15,400 gal)
Retention: 29.6 min

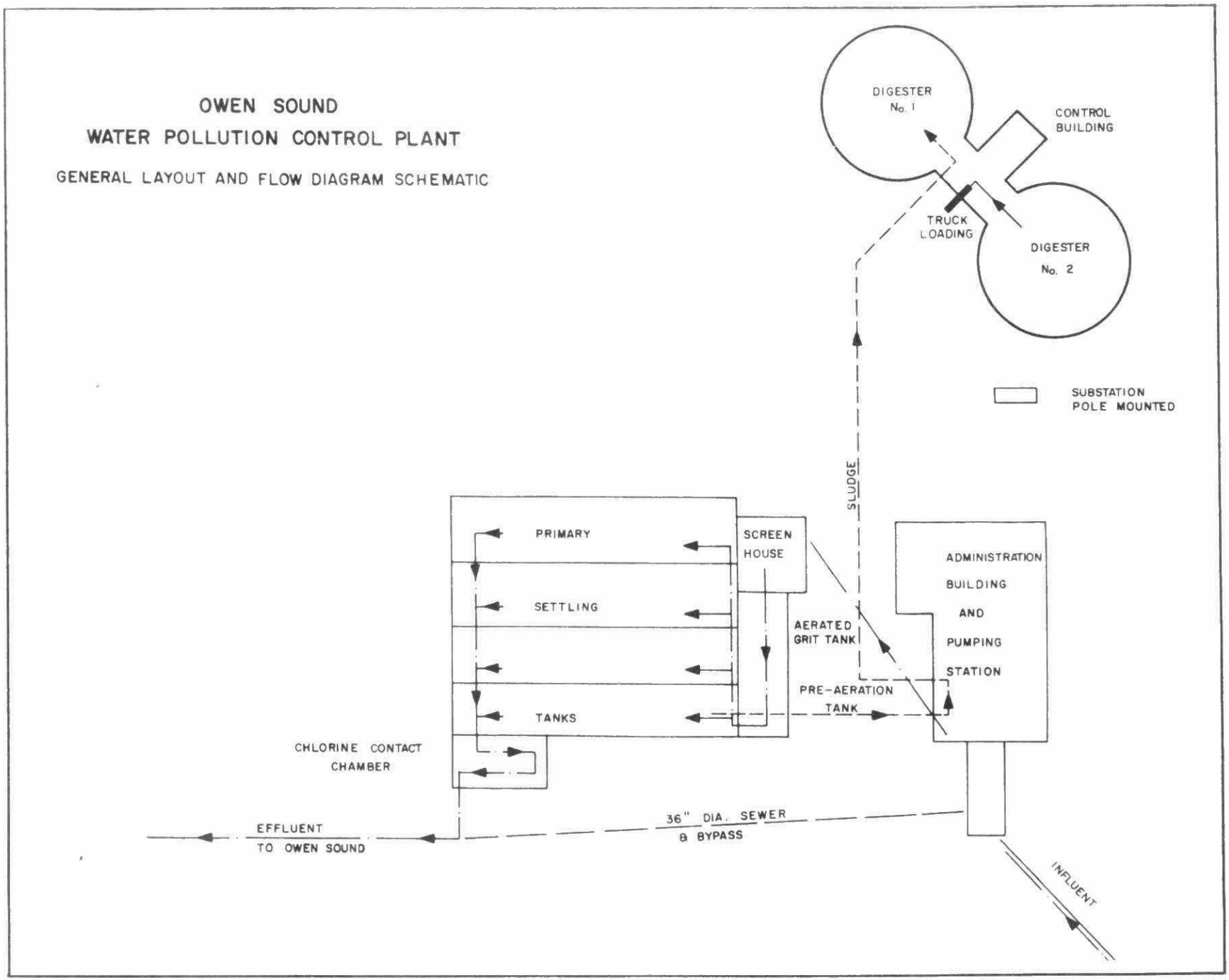
OUTFALL

to Credit River

SLUDGE HANDLING

Digestion System - Single Stage

Type: Carter gas mixed, floating cover
Size: One 45' dia x 20' swd
(34,500 cu ft or 215,000 gal)
Loading: 1.5 lb/cu ft/mo


OWEN SOUND
WATER POLLUTION CONTROL PLANT
GENERAL LAYOUT AND FLOW DIAGRAM SCHEMATIC
DIGESTER No. 1
CONTROL BUILDING
TRUCK LOADING
DIGESTER No. 2
SUBSTATION POLE MOUNTED
SLUDGE
PRIMARY
SETTLING
TANKS
SCREEN HOUSE
AERATED GRIT TANK
PRE-AERATION TANK
ADMINISTRATION BUILDING AND PUMPING STATION
CHLORINE CONTACT CHAMBER
EFFLUENT TO OWEN SOUND
36" DIA. SEWER & BYPASS
INFLUENT

DESIGN DATA

PROJECT NO.	2-0069-60
TREATMENT	Primary
DESIGN FLOW	3.0 mgd
DESIGN POPULATION	25,000
BOD - Raw Sewage	180 mg/l
- Removal	40%
SS - Raw Sewage	200 mg/l
- Removal	65%

SEWAGE PUMPING STATION

Screening

- 1 3/4" spacing

Pumps

Type: Worthington
Size: Three 3150 gpm @ 33' tdh
(One diesel standby)

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: One Model C (36")

Grit Removal

Type: Aerated
Size: One 18½ X 13 X 12' (18,000 gal)
Retention: 8.6 min

Pre-aeration Tank

Size: One 23' 9" X 13 X 12'
(23,400 gal)
Retention: 11.2 min

Air Supply

Type: Sutorbilt
Size: Two 408 scfm @ 6 psi

Primary Sedimentation

Type: Rex Linkbelt
Size: Two 78 X 32 X 12½'
(388,000 gal)
Retention: 3.11 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 8,260 gal/ft/day

CHLORINATION

Type: W & T
Size: One 2000 lb/day

Chlorine Contact Chamber

Size: One 31 X 14 X 8' (21,700 gal)
Retention: 11.2 min

OUTFALL

- 828' to Owen Sound

SLUDGE HANDLING

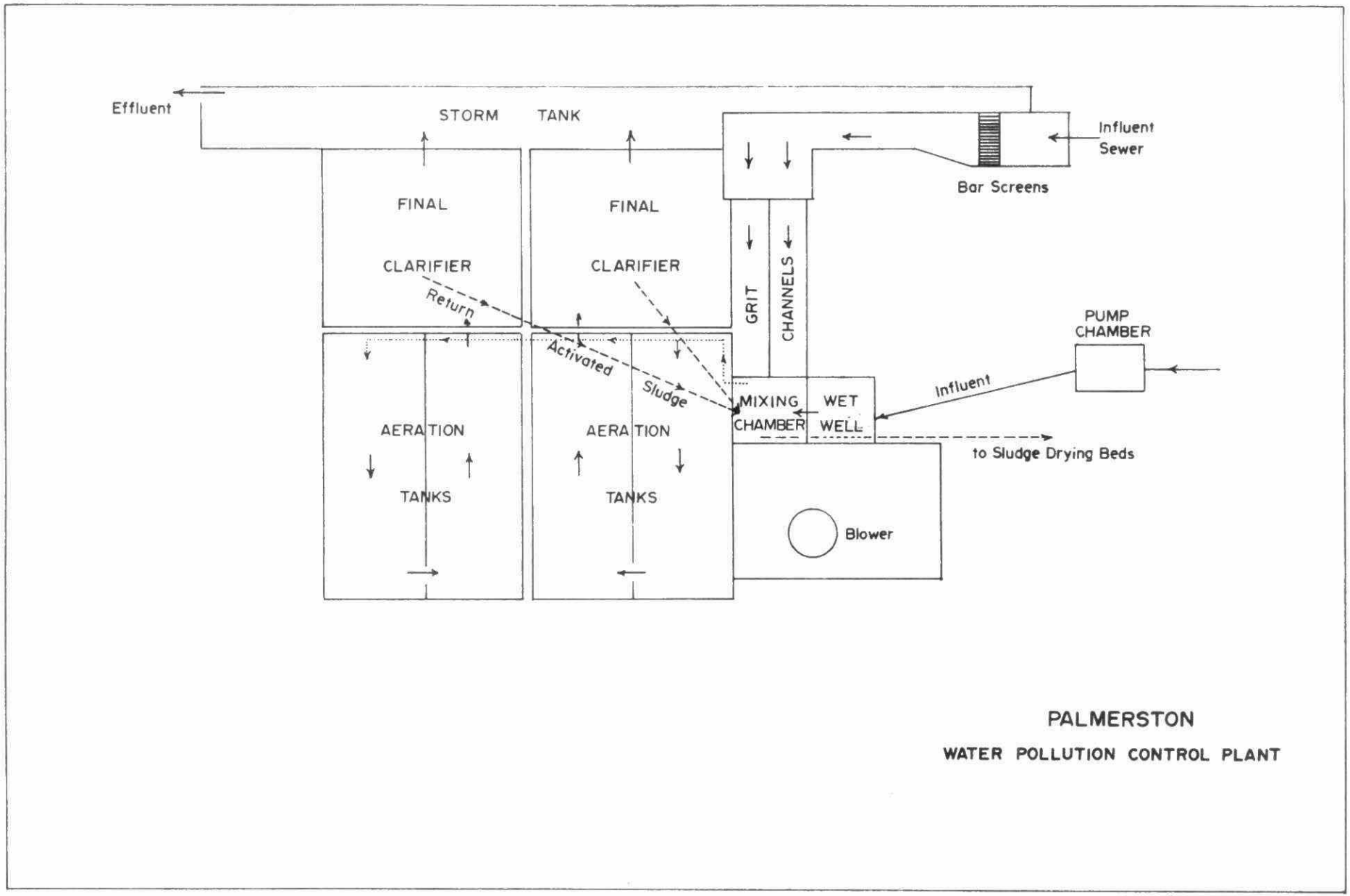
Digestion System - Two-stage

Primary --
Type: PFT with one Sutorbilt compressor
Size: One 40' dia x 25' swd (31,400 cu ft or 0.196 mil gal)
Loading: 2.75 lb/cu ft/mo

Secondary --
Size: One 40' dia x 24½' swd (30,800 cu ft or 0.192 mil gal)
Total Loading: 1.88 lb/cu ft/mo

WEST SIDE PUMPING STATION

One - 3916 gpm Chicago Pump
Two - 1000 gpm Smart-Turner
Standby - Diesel generator


Effluent
STORM TANK
Influent Sewer
Bar Screens
FINAL CLARIFIER
FINAL CLARIFIER
GRIT CHANNELS
Return
Activated Sludge
PUMP CHAMBER
Influent
MIXING CHAMBER
WET WELL
to Sludge Drying Beds
AERATION TANKS
AERATION TANKS
Blower
PALMERSTON
WATER POLLUTION CONTROL PLANT

DESIGN DATA

Project No:	1-0216-69
Treatment:	High Rate Activated Sludge
Design Flow:	0.34 MIGD (estimated)
BOD:	Raw sewage 76 mg/l (estimated)
SS:	Raw sewage 60 mg/l (estimated)

PRETREATMENT

RAW SEWAGE PUMPING:
1, centrifugal pump

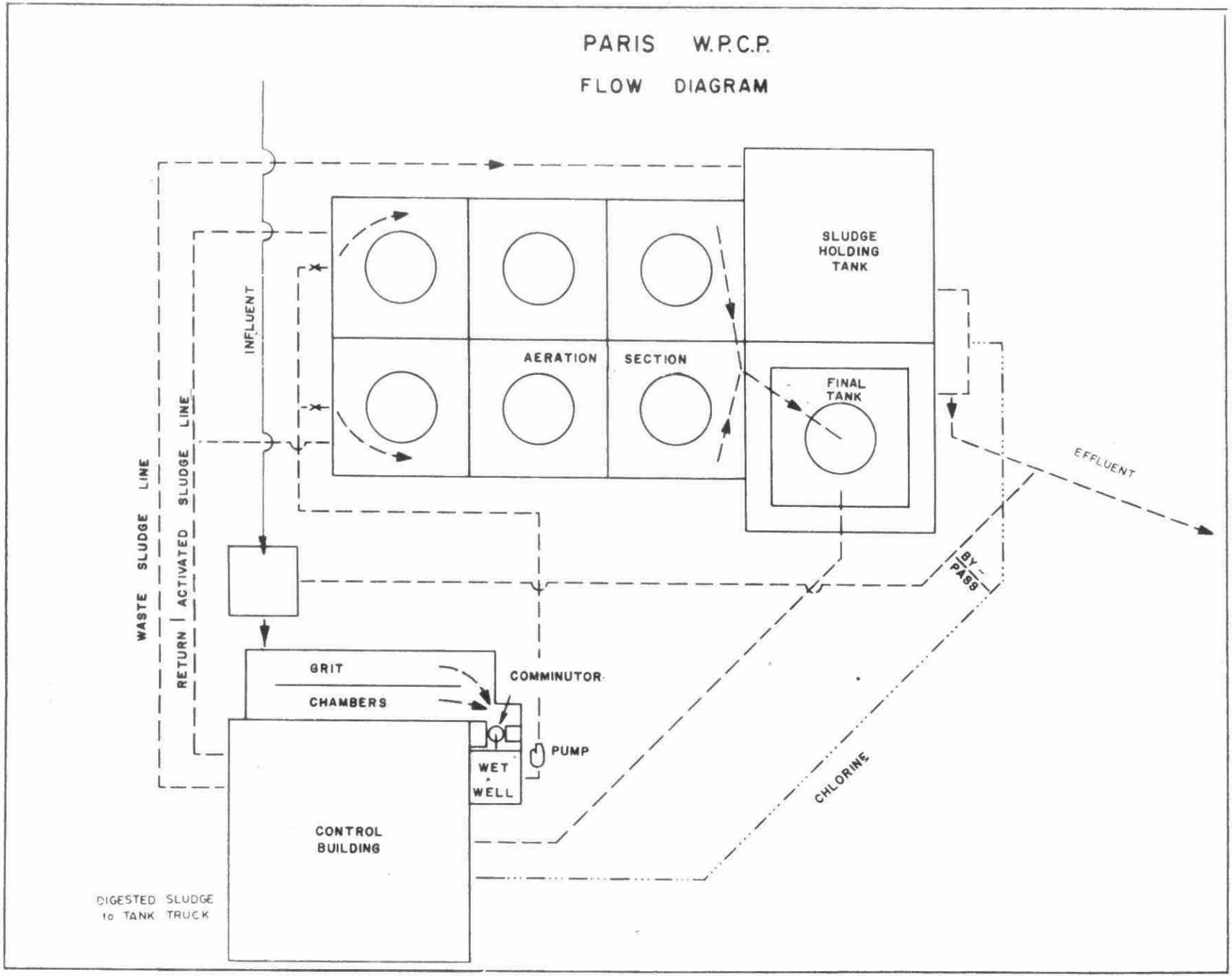
GRIT REMOVAL:
Two grit channels, each 16' x 2' x 4.1'
Volume (each) 820 I. Gal Detention (each) 3.5 min.

SCREENING:
Bar screens at influent sewer

BIOLOGICAL TREATMENT:

AERATION TANKS:
Four, each 28' x 7.6' x 8.3'
Volume (total) 44, 200 I. Gal.
Detention: 3.2 hours
Blower 1, size 340 cfm at 8 psi

FINAL CLARIFIERS:
Two, each 15.6' x 15.6' Hopper Bottom
Volume (total) 28, 000 I. Gal.
Detention: 2.0 hours
Overflow rate: 700 gal/ft^2/day


PARIS W.P.C.P.
FLOW DIAGRAM
SLUDGE HOLDING TANK
AERATION SECTION
FINAL TANK
INFLUENT
WASTE SLUDGE LINE
RETURN ACTIVATED SLUDGE LINE
EFFLUENT
BY-PASS
GRIT CHAMBERS
COMMINUTOR
PUMP
WET WELL
CHLORINE
CONTROL BUILDING
DIGESTED SLUDGE to TANK TRUCK

DESIGN DATA

PROJECT NO.	2-0034-59
TREATMENT	Extended Aeration
DESIGN FLOW	0.50 mgd
DESIGN POPULATION	3,600
BOD - Raw Sewage	200 mg/l
SS - Raw Sewage	170 mg/l

PRETREATMENT

Grit Removal

Type: Channel; manually cleaned
Size: Two 25 X $2\frac{1}{2}$ X $2\frac{1}{2}$'

Comminution

Type: Jones & Atwood (1)

RAW SEWAGE PUMP

Type: Worthington
Size: One 335 gpm @ 12' tdh

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass
Size: Two 96 X 32 X 10' (372,000 gal)
Retention: 17.9 hr

Aerators

- Ames Crosta (6)

Secondary Sedimentation

Type: Dorr
Size: Two 36 X 36 X 9' swd (145,000 gal)
Retention: 3.5 hr
Loading: Surface, 387 gal/ft^2/day
Weir, 38,000 gal/ft/day (one tank)

CHLORINATION

Type: W & T
Size: One 400 lb/day

Chlorine Contact Chamber

- in outfall

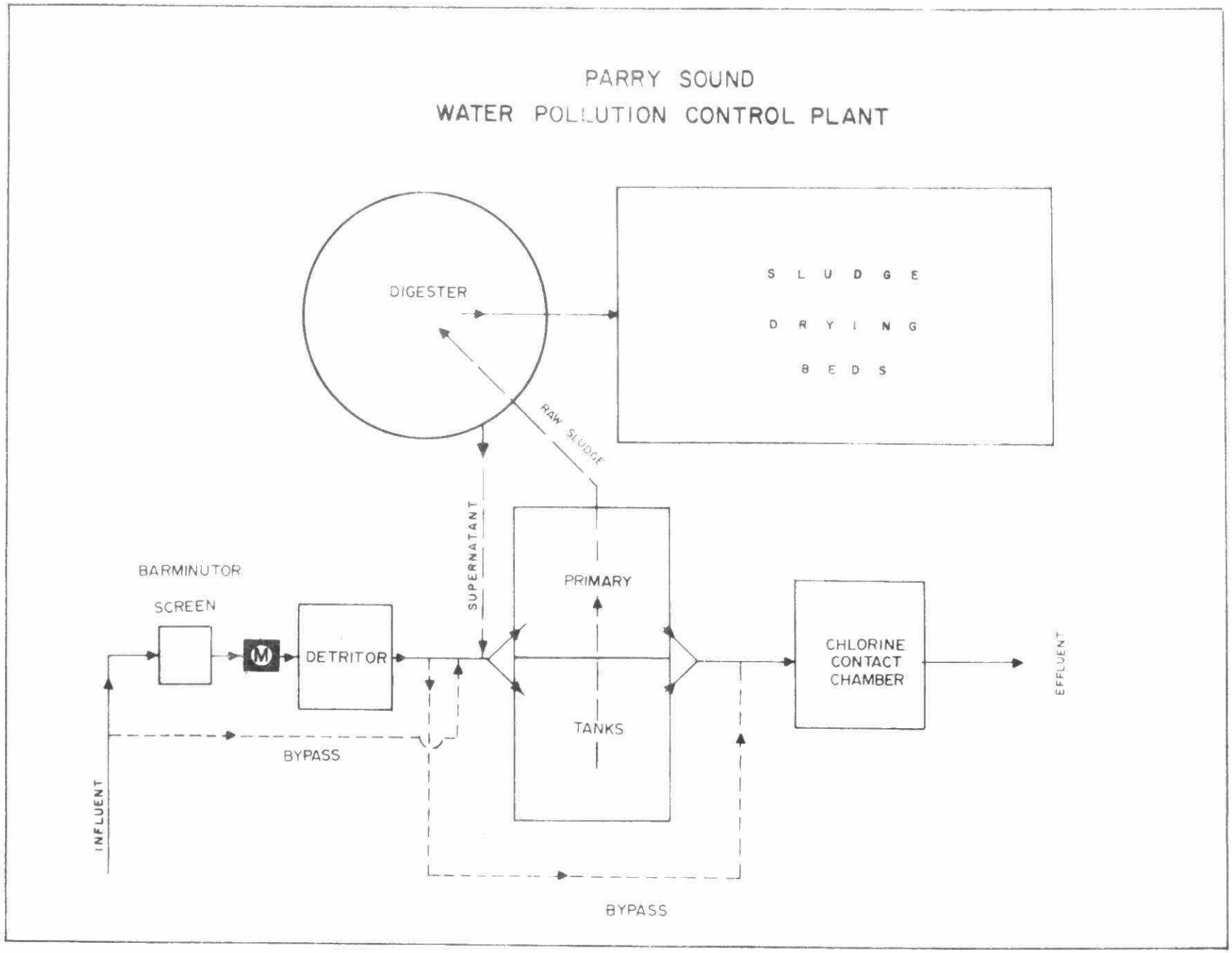
OUTFALL

- to Grand River

SLUDGE HANDLING

Holding Tank

- one of the sedimentation tanks, without mechanism, is provided as a holding tank.


PARRY SOUND
WATER POLLUTION CONTROL PLANT
DIGESTER
SLUDGE DRYING BEDS
RAW SLUDGE
SUPERNATANT
BARMINUTOR
SCREEN
M
DETRITOR
PRIMARY
TANKS
CHLORINE CONTACT CHAMBER
EFFLUENT
INFLUENT
BYPASS
BYPASS

DESIGN DATA

PROJECT NO.	2-0113-62
TREATMENT	Primary
DESIGN FLOW	0.83 mgd
DESIGN POPULATION	7,500
BOD - Raw Sewage	250 mg/l
- Removal	35%
SS - Raw Sewage	200 mg/l
- Removal	35%

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: One Model C (18")

Grit Removal

Type: Dorr Detritor
Size: One 10 X 10 X $1\frac{1}{4}$'
Retention: 1.35 min

Primary Sedimentation

Type: Dorr
Size: Two 30' x 30' x 10' swd
(112,000 gallons)
Retention: 3.24 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 3700 gal/ft/day

CHLORINATION

Type: W & T, Type A-731
Size: One 200 lb/day

Chlorine Contact Chamber

Size: One $25\frac{1}{2}$ X $8\frac{1}{2}$ X 8'
(11,150 gal)
Retention: 19.2 min

OUTFALL

- to McCurry Lake

SLUDGE HANDLING

Digestion System - single-stage

Type: Dorr draft tubes (2)
Size: One 35' dia x 20' 9" swd
(20,580 cu ft or 138,000 gal)
Loading: 0.85 lb/cu ft/mo

Drying Beds

- Four $76\frac{1}{2}$ X 29'

PUMPING STATIONS

#2 Ejector Station

Type: Smith & Loveless
Size: One 100 gpm @ 135' tdh

#1 Pumping Station

Type: Flygt
Size: Two 40 gpm @ 26' tdh

#7 Pumping Station (Bay St.)

Type: Flygt
Size: One 40 gpm @ 35' tdh

#3 Pumping Station (Hawthorn Cr.)

Type: Flygt
Size: One 50 gpm

#4 Pumping Station (William St.)

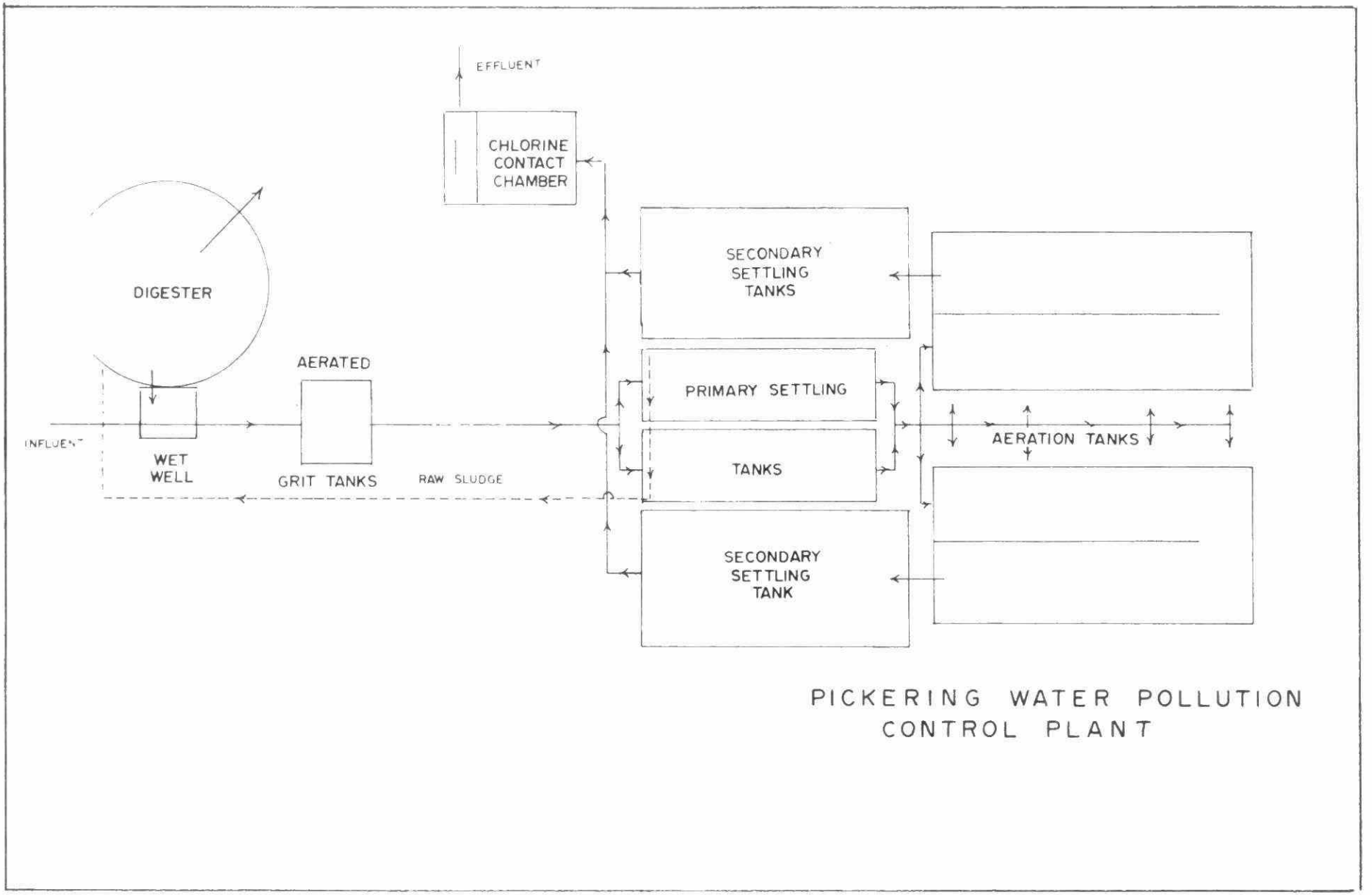
Type: Flygt
Size: Two 250 gpm @ 36' tdh

#5 Pumping Station (Cascade St.)

Type: Robert Morse (Weinman)
Size: Two 420 gpm @ 41' tdh

#6 Pumping Station

Type: Robert Morse
Size: Two 860 gpm @ 150' tdh



PICKERING WATER POLLUTION CONTROL PLANT

DESIGN DATA

PROJECT NO.		1-0015-66
TREATMENT	Con.	Secondary
DESIGN FLOW		0.40 migd
BOD - Raw Sewage		220 mg/l
- Removal		90-95%
SS - Raw Sewage		250 mg/l
- Removal		90-95%

GRIT REMOVAL

Type: Aerated with airlift
Size: One 12' x 14' x 10' (eff. depth)
Volume: 1680 ft^3 or 10,500 gal
Detention: 38 minutes

COMMINUTION

Bar Screen - on by-pass

PRIMARY SEDIMENTATION

Size: Two 20' x 12' x12'6" (avg. depth)
Volume: 6000 ft^3 or 37,400 gal
Detention: 2.25 hours
Loading: Surface 795 gpd/ft^2 Weir

AERATION

Type: Diffused air, two-pass
Size: Two 35' x 2 x 12' x 12'
Volume: 20,000 ft^3 or 125,000 gal
Detention: 7.5 hours
Diffusers: Ceramic Tubes (17 per pass)

SECONDARY SEDIMENTATION

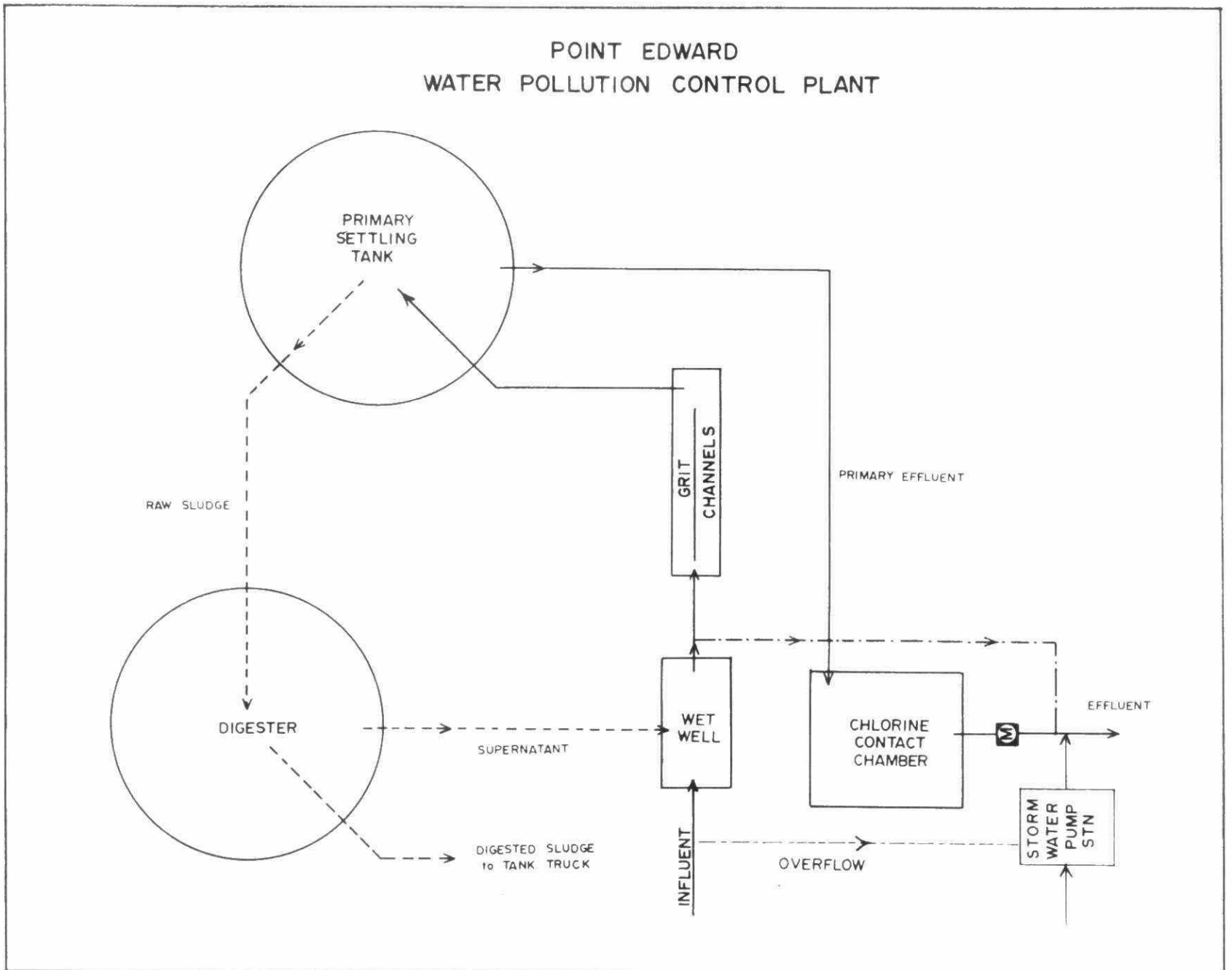
Size: Two 25' x 12' x 11'6" (avg)
Volume: 6900 ft^3 or 43,000 gal
Detention: 2.58 hr
Loading: Surface 666 gpd/ft^2
Weir 4160 gpd/ft

CHLORINE CONTACT CHAMBER

Size: 4 passes 12' x 5'4" x 10'9"
Volume: 2750 ft^3 or 17,200 gal
Detention: 62 minutes

DIGESTION

Single Stage, gas mixed, fixed concrete roof
Size: one 28' dia x 24' swd
Volume: 15,200 ft^3 or 95,000 gal


POINT EDWARD
WATER POLLUTION CONTROL PLANT
PRIMARY SETTLING TANK
GRIT CHANNELS
PRIMARY EFFLUENT
RAW SLUDGE
DIGESTER
SUPERNATANT
WET WELL
CHLORINE CONTACT CHAMBER
EFFLUENT
DIGESTED SLUDGE to TANK TRUCK
INFLUENT
OVERFLOW
STORM WATER PUMP STN

DESIGN DATA

PROJECT NO.	2-0036-59
TREATMENT	Primary
DESIGN FLOW	0.57 mgd
DESIGN POPULATION	5,700
BOD - Raw Sewage	170 mg/l
- Removal	47%
SS - Raw Sewage	200 mg/l
- Removal	60%

RAW SEWAGE PUMPS

Type: Fairbanks-Morse
Size: Two 1300 Igpm @ 35' tdh

PRIMARY TREATMENT

Screening

Type: Bar screens, manually cleaned
Size: Two; $1\frac{1}{4}$" spacing

Grit Removal

Type: Channels
Size: Two 16 X 1.75 X 2'
Retention: 0.88 min

Primary Sedimentation

Type: Dorr
Size: One 35' dia x 10' swd
(60,000 Imp. gal)
Retention: 2.53 hr
Loading: Surface, 594 Imp. gal/ft^2/day
Weir, 5,190 Imp. gal/ft/day

CHLORINATION

Type: BIF
Size: One 200 lb/day

Chlorine Contact Chamber

Size: One 20 X 10 X $8\frac{1}{2}$' (10,600 gal)
Retention: 27 min

OUTFALL

- to St. Clair River

SLUDGE HANDLING

Digestion System - Single-stage

Type: Dorr: 2 draft tube mixers
Size: One 35' dia x 20' swd (19,200 cu ft or 119,808 gal)
Loading: 1.07 lb/cu ft/mo

PUMPING STATIONS

Storm Water

Type: Custom Built
Size: One 4700 gpm @ 20' tdh
Two 10000 gpm @ 20' tdh
with two 100 hp diesel standbys

Helena Street

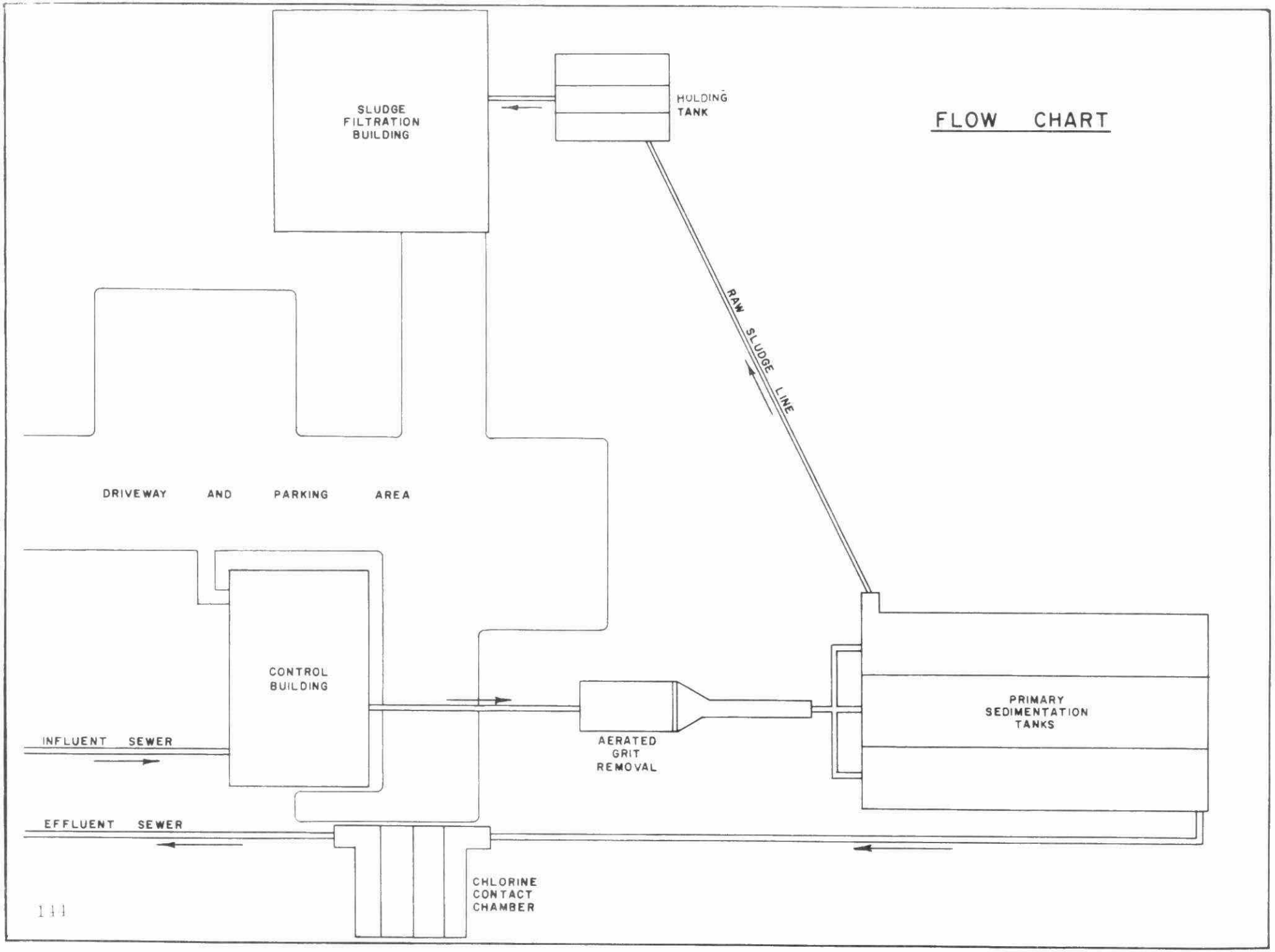
Type: Smith & Loveless
package lift station
Size: Two 750 gpm @ 40' tdh

Michigan Avenue

Type: Smith & Loveless
package lift station
Size: Two 500 gpm @ 20' tdh

402 Station (2-0183-65)

Type: Smith & Loveless
Package Lift Station
Size: Two 175 gpm @ 23' tdh


FLOW CHART
SLUDGE FILTRATION BUILDING
HOLDING TANK
RAW SLUDGE LINE
DRIVEWAY AND PARKING AREA
CONTROL BUILDING
INFLUENT SEWER
AERATED GRIT REMOVAL
PRIMARY SEDIMENTATION TANKS
EFFLUENT SEWER
CHLORINE CONTACT CHAMBER

DESIGN DATA

PROJECT NO.	2-0115-62
TREATMENT	Primary
DESIGN FLOW	2.1 mgd
DESIGN POPULATION	5,300
BOD - Raw Sewage	210 mg/l
- Removal	30%
SS - Raw Sewage	296 mg/l
- Removal	60%

RAW SEWAGE PUMPS

Type: Worthington
Size: One 800 gpm @ 24' tdh
One 500 gpm @ 24' tdh
Two 1750 gpm @ 25' tdh

PRIMARY TREATMENT

Grit Removal

Type: Aerated, mechanical grit collector (Rex Chainbelt)
Size: One 20' x 10' x 11.85' (14,750 gal)
Retention: 10 min

Air Supply

Type: Roots-Connersville
Size: Two 130 scfm

Primary Sedimentation

Type: Rex Chainbelt
Size: Three 75' x 15' x 8' (168,000 gal)
Retention: 1.93 hr
Loading: Surface, 620 gal/ft^2/day
Weir, 46,500 gal/ft/day

CHLORINATION

F & P automatic

Chlorine Contact Chamber

Size: One 21½' x 18' x 6½' (15,950 gal)
Retention: 11 min

OUTFALL

to Lake Erie

SLUDGE HANDLING

Aerated holding tank, one
20' x 15' x 8.2' (avg)
Size: 2,460 ft^3 or 12,750 gal

Vacuum Filter

Type: Eimco (cloth)
Size: One 200 sq ft

PUMPS -- TYPE and SIZE

#1 Pumping Station (custom-built)

Type: Worthington
Size: Three 1750 gpm @ 66' tdh (station has one Barminutor, Model C)

#2 Pumping Station (prefabricated)

Type: Fairbanks-Morse
Size: Two 417 gpm @ 48' tdh

#3 Pumping Station (prefabricated)

Type: Fairbanks-Morse
Size: Two 207 gpm @ 65' tdh

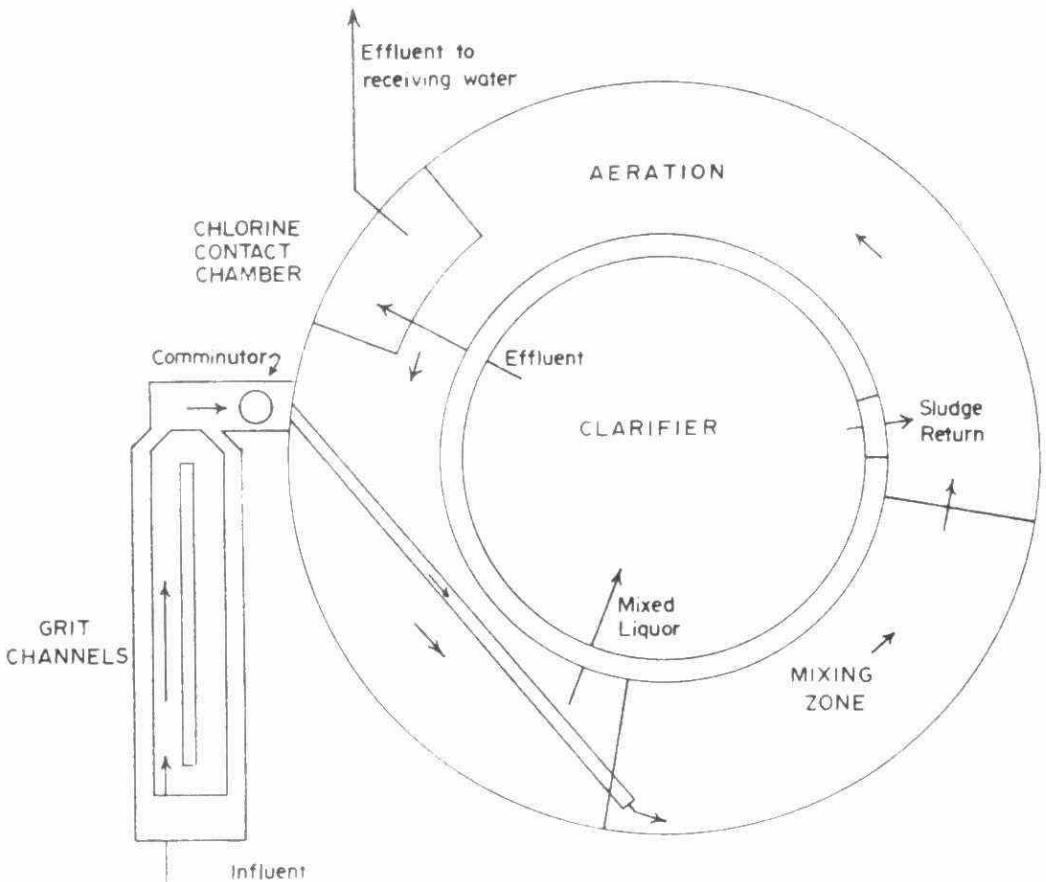
#4 Pumping Station

Type: Flygt submersible
Size: Two 217 gpm @ 19' tdh

NOTE: Above pumping stations have overflows to Lynn River

PORT McNICOLL

WATER POLLUTION CONTROL PLANT



DESIGN DATA

Project No.	1-0091-67
Treatment:	Extended Aeration
Design Flow:	0.23 MGD

PRETREATMENT

RAW SEWAGE PUMPS:
Two, Type: Pacific
Size: 485 USGPM at 38' TDH

GRIT CHANNELS:
Two, 12' x 1' x 1.25' awd
Volume: (each) 94 gal. Detention: 0.6 min.

BIOLOGICAL TREATMENT

MIXING CHAMBER:
Volume: 30,000 I. Gal.
Detention: 3.1 hours

CLARIFIER:
29.2' dia. x 12.25' swd
Volume: 52,680 I. Gal.
Detention: 5.4 hours
Overflow Rate: 329 I. Gal/ft^2/day

REAERATION CHAMBER:
Volume: 60,000 I. Gal.

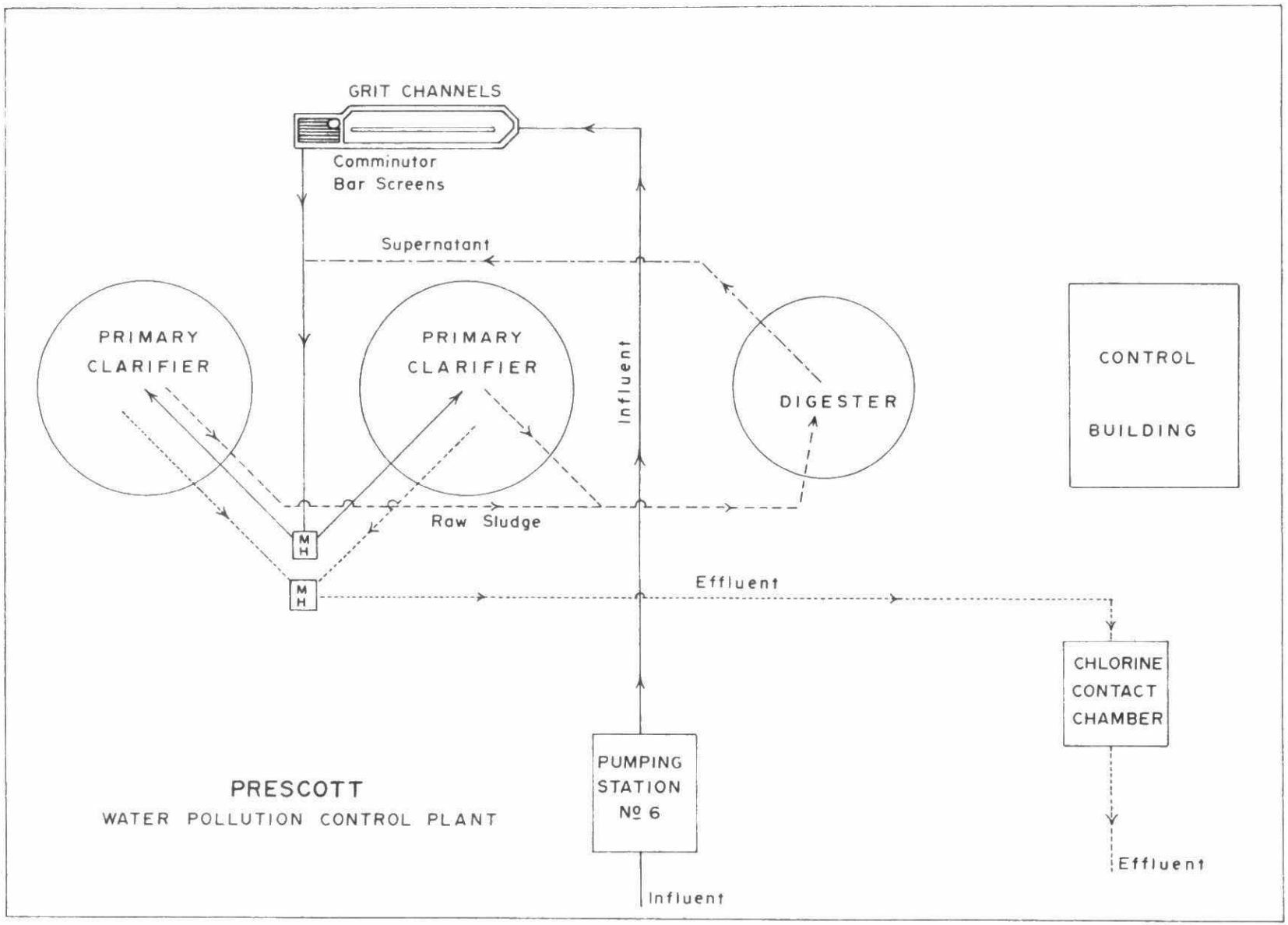
Blowers: Three type: CORD/CA-59
Size: 600 cfm at 15 psi

AEROBIC DIGESTER 1:
Volume: 26,000 I. Gal.

AEROBIC DIGESTER 2:
Volume: 17,000 I. Gal.

CHLORINE CHAMBER:
Volume: 7,400 I. Gal.
Detention: 46 min.

SLUDGE HOLDING TANK:
Volume: 8,700 I. Gal.


GRIT CHANNELS
Comminutor
Bar Screens
Supernatant
PRIMARY
CLARIFIER
PRIMARY
CLARIFIER
Influent
DIGESTER
CONTROL
BUILDING
Raw Sludge
MH
MH
Effluent
CHLORINE
CONTACT
CHAMBER
PUMPING
STATION
Nº 6
PRESCOTT
WATER POLLUTION CONTROL PLANT
Effluent
Influent

DESIGN DATA

PROJECT NO. 1-0023-66

TREATMENT Primary

DESIGN FLOW 1.0 MIGD

PRIMARY TREATMENT

Grit Removal

Type: Manually cleaned
Size: Two 26'2" x 3'9" x 3'4"
Flow Velocity: 1.0 fps

Screening

Type: Manually cleaned
Size: 1" openings

Comminution

Type: Worthington #15-5

Primary Sedimentation

Type: Dorr-Oliver
Size: Two 35' dia x 9' swd.
(108,000 I. gals. total)
Retention: $2\frac{1}{2}$ hours
Loading: Surface 1,000 I. gals/ ft^2/day
Weir, 10,000 I. gals/ ft/day

CHLORINATION

Type: Wallace & Tiernan A-831
Size: Two 50 lbs/day each

Chlorine Contact Chamber

Size: 33,800 gal.
Retention: 30 minutes

OUTFALL

1650' 42" dia. concrete pipe to
St. Lawrence River

SLUDGE HANDLING

Digestion System

Type: Single stage
Size: 35' dia x 18 swd (108,000 I. Gals)
Loading: 1.6 lb/ft^3/mo.
Recirculation Pump: Smart Turner

PUMPING STATION

a) West Street

Two Smart-Turner, each 870 IGPM @ 36' tdh

b) East Street

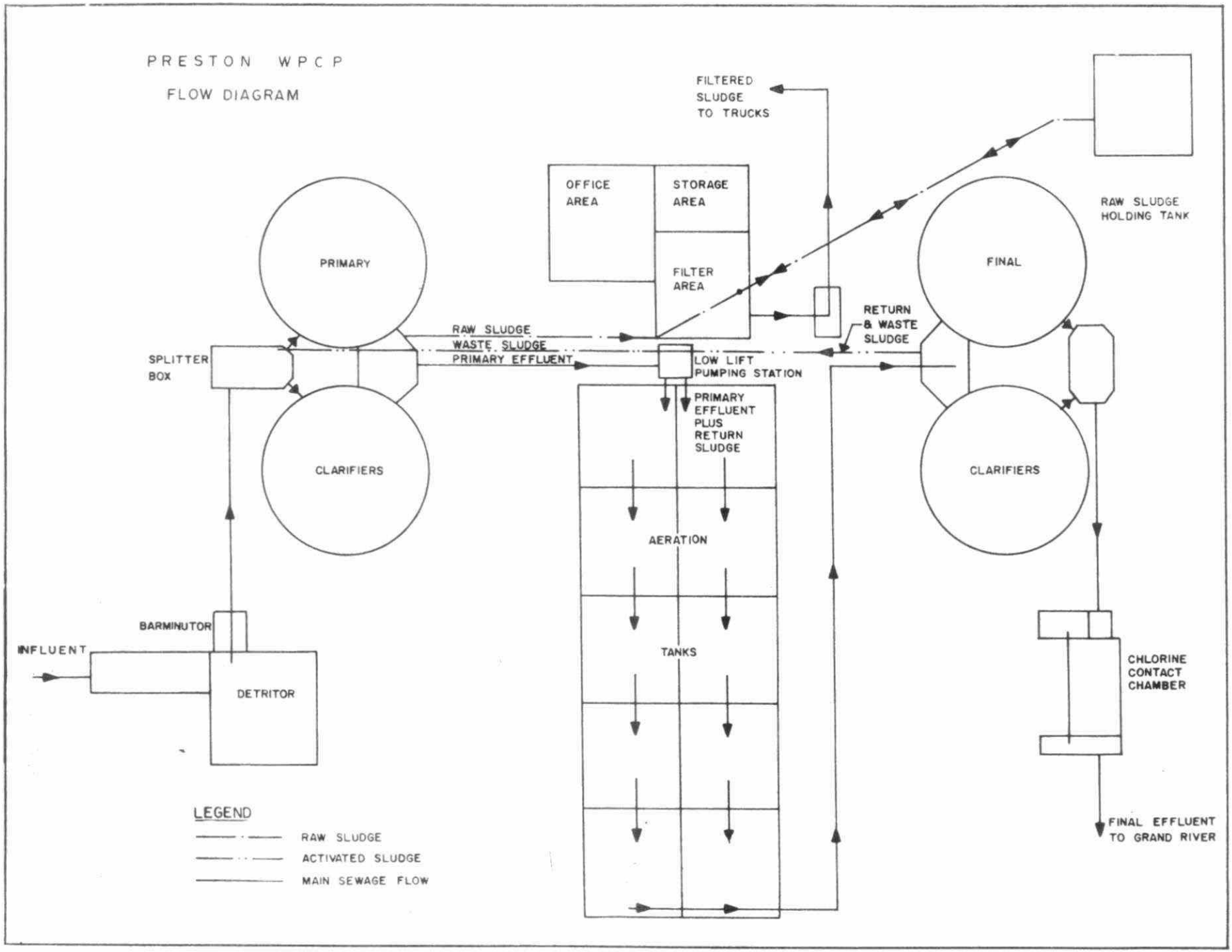
Two Smart-Turner, each 1410 IGPM @ 44' tdh

c) Highway 2 & Keefer Street

Two Smart-Turner, each 2100 IGPM @ 76' tdh

d) Plant Site

Three Smart-Turner, 1400 IGPM@ 33' tdh


PRESTON WPCP
FLOW DIAGRAM
FILTERED SLUDGE TO TRUCKS
OFFICE AREA
STORAGE AREA
FILTER AREA
RAW SLUDGE HOLDING TANK
PRIMARY
FINAL
RETURN & WASTE SLUDGE
RAW SLUDGE
WASTE SLUDGE
PRIMARY EFFLUENT
SPLITTER BOX
LOW LIFT PUMPING STATION
PRIMARY EFFLUENT PLUS RETURN SLUDGE
CLARIFIERS
CLARIFIERS
AERATION
TANKS
BARMINUTOR
INFLUENT
DETRITOR
CHLORINE CONTACT CHAMBER
FINAL EFFLUENT TO GRAND RIVER
LEGEND
RAW SLUDGE
ACTIVATED SLUDGE
MAIN SEWAGE FLOW

DESIGN DATA

PROJECT NO.	2-0046-59
TREATMENT	Activated Sludge
DESIGN FLOW	1.8 mgd
DESIGN POPULATION	15,000
BOD - Raw Sewage	300 mg/l
- Removal	95%
SS - Raw Sewage	350 mg/l
- Removal	90%

PRIMARY TREATMENT

Grit Removal

Type: Dorr detritor
Size: One 20' x 20' x 1½' (3,740 gal)
Retention: 2.1 min

Comminution

Type: Barminutor
Size: Model C (36")

Primary Sedimentation

Type: Dorr
Size: Two 50' dia x 10' swd
(246,000 gal)
Retention: 3.3 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 5730 gal/ft/day

Sewage Lift Pumps

Type: Worthington
Size: Two 1800 gpm @ 17.4' tdh

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass
Size: Two 150' x 30' x 13'
(731,000 gal)
Retention: 9.8 hr

Aerators

- Ten Ames-Crosta

Secondary Sedimentation

Type: Dorr
Size: Two 50' dia x 10' swd
(246,000 gal)
Retention: 3.3 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 5730 gal/ft/day

CHLORINATION

Type: F & P
Size: One 400 lb/day

Chlorine Contact Chamber

Size: One 30' x 15' x 6' 8"
(18,700 gal)
Retention: 15 min

OUTFALL

- to Grand River

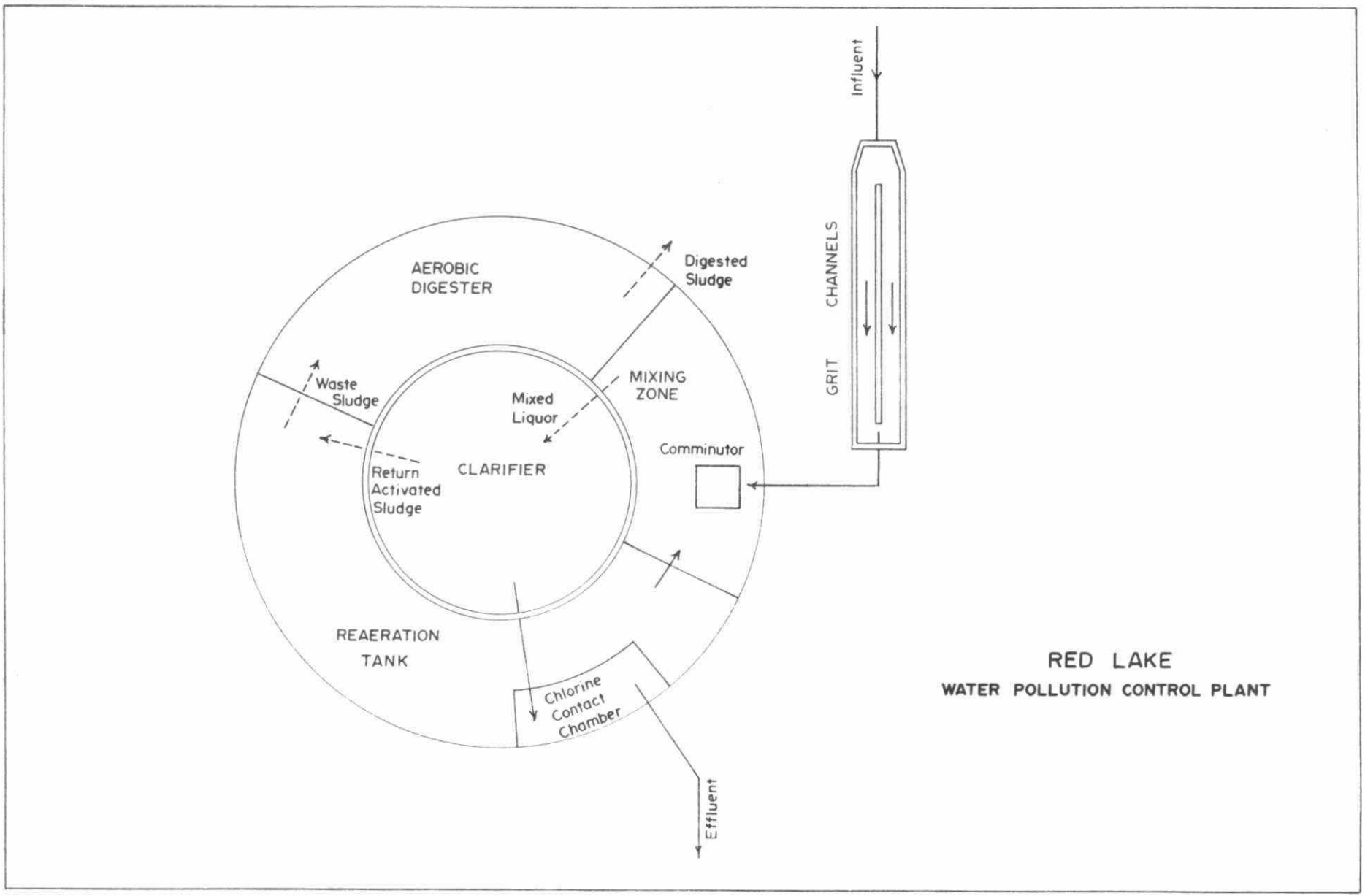
SLUDGE HANDLING

Holding Tank

Size: One 20' x 20' x 11'
(4,400 cu ft or 27,400 gal)

Vacuum Filter

Type: Komline-Sanderson
Size: One 250 sq ft



RED LAKE

WATER POLLUTION CONTROL PLANT

DESIGN DATA

Project No:	1-0040-66
Treatment:	Contact Stabilization
Design Flow:	0.3 MGD
BOD:	Raw Sewage 510 lb/day

RAW SEWAGE PUMPING:
Pumping Station 1
Two, 430 USGPM at 68' TDH

Pumping Station 2
Two, 125 USGPM at 51' TDH

PRETREATMENT

GRIT CHANNELS:
Two, each 20' x 2' x 2'8" swd
Volume: (each) 650 I. Gal. Detention: (each) 3 min.

BAR SCREENS:
$\frac{1}{4}$" x 2" steel bars on 2" centers

BIOLOGICAL TREATMENT

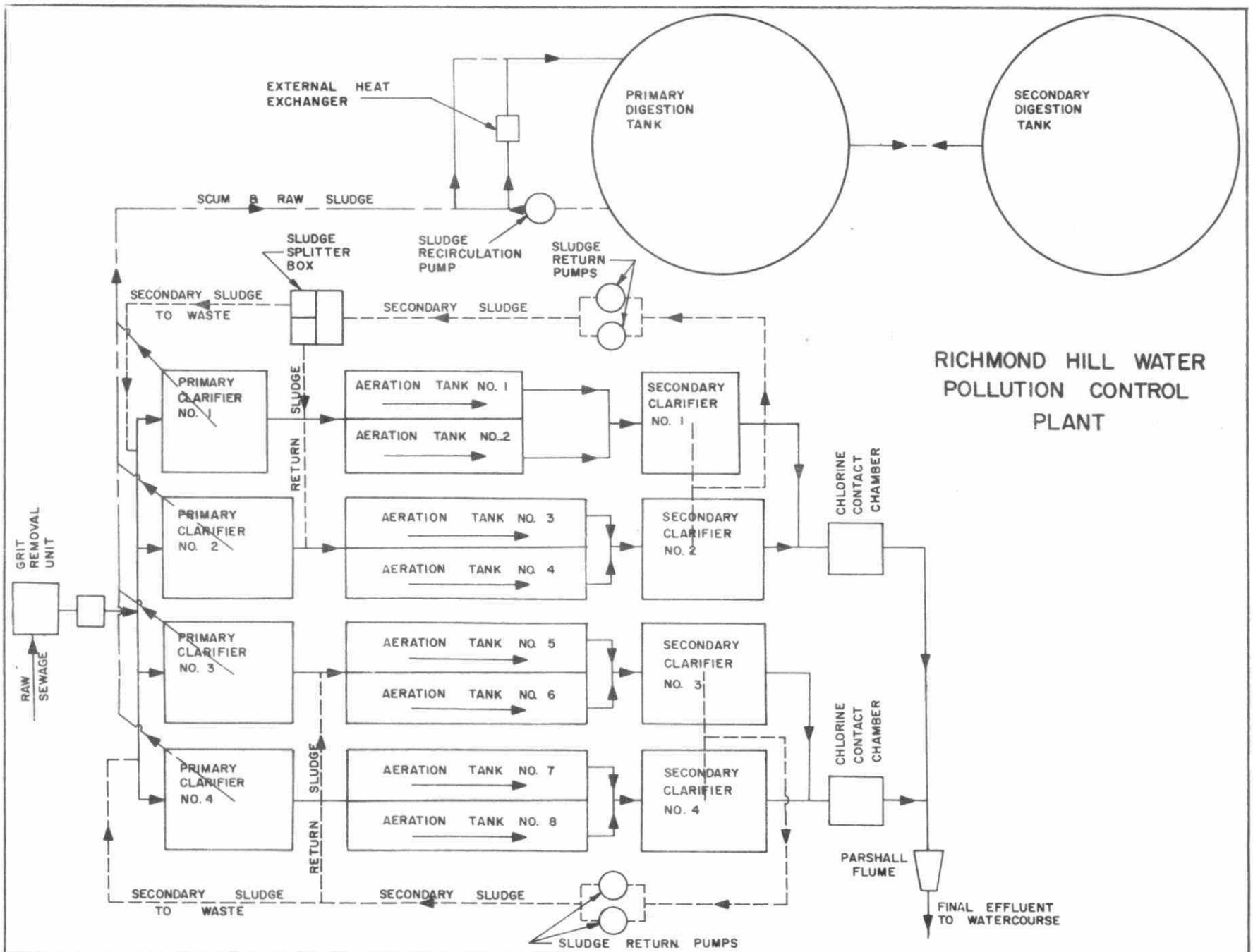
MIXING TANK:
Volume: 33, 400 I. Gal.
Contact Time: 2.7 hours

REAERATION TANK:
Volume: 77, 400 I. Gal.

CLARIFIER:
25'8" dia. x 15' swd
Volume: 48, 200 I. Gal.
Detention: 3.9 hours
Overflow Rate: 580 I. Gal/ft^2/day

AEROBIC DIGESTER:
Volume: 48, 000 I. Gal.

CHLORINE CONTACT CHAMBER:
Volume: 8400 I. Gal.
Detention: 40 min.


EXTERNAL HEAT EXCHANGER
PRIMARY DIGESTION TANK
SECONDARY DIGESTION TANK
SCUM & RAW SLUDGE
SLUDGE SPLITTER BOX
SLUDGE RECIRCULATION PUMP
SLUDGE RETURN PUMPS
SECONDARY SLUDGE TO WASTE
SECONDARY SLUDGE
RICHMOND HILL WATER POLLUTION CONTROL PLANT
PRIMARY CLARIFIER NO. 1
SLUDGE
RETURN
AERATION TANK NO. 1
AERATION TANK NO. 2
SECONDARY CLARIFIER NO. 1
CHLORINE CONTACT CHAMBER
GRIT REMOVAL UNIT
PRIMARY CLARIFIER NO. 2
AERATION TANK NO. 3
AERATION TANK NO. 4
SECONDARY CLARIFIER NO. 2
RAW SEWAGE
PRIMARY CLARIFIER NO. 3
AERATION TANK NO. 5
AERATION TANK NO. 6
SECONDARY CLARIFIER NO. 3
CHLORINE CONTACT CHAMBER
PRIMARY CLARIFIER NO. 4
AERATION TANK NO. 7
AERATION TANK NO. 8
SECONDARY CLARIFIER NO. 4
PARSHALL FLUME
FINAL EFFLUENT TO WATERCOURSE
SECONDARY SLUDGE TO WASTE
SECONDARY SLUDGE
SLUDGE RETURN PUMPS

DESIGN DATA

PROJECT NO.	2-0006-57
TREATMENT	Activated Sludge
DESIGN FLOW	1.60 mgd
DESIGN POPULATION	16,000
BOD - Raw Sewage	200 mg/l
- Removal	90%
SS - Raw Sewage	220 mg/l
- Removal	95%

PRIMARY TREATMENT

Grit Removal

Type: Aerated
Size: One 15½' x 6' x 9' swd (5,220 gal)
Retention: 4.7 min

Primary Sedimentation

Type: Dorr
Size: One 16' dia x 10' swd
One 26' dia x 10' swd
Two 26' dia x 9.7' swd
(110,000 gal)
Retention: 1.65 hr
Loading: Surface, 908 gal/ft^2/day
Weir, 4880 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 58' x 9' x 9'
Two 81' x 14½' x 10¼'
Four 81' x 14½' x 9 1/3'
(482,700 gal)
Retention: 7.2 hr

Diffusers

- Carborundum diffusers

Air Supply

a) Type: Standaire (C.P.)
Size: One 400 scfm
Two 510 scfm

b) Type: Sutorbilt
Size: One 1,000 scfm

Secondary Sedimentation

Type: Dorr
Size: One 19' dia x 10' swd
One 30' dia x 10' swd
Two 30' dia x 9.7' swd
(147,180 gal)
Retention: 2.21 hr
Loading: Surface, 667 gal/ft^2/day
Weir, 4120 gal/ft/day

CHLORINATION

Type: W & T
Size: One 200 lb/day

Chlorine Contact Chamber

Size: Two 25' x 10' x 8' (25,000 gal)
Retention: 22½ min

OUTFALL

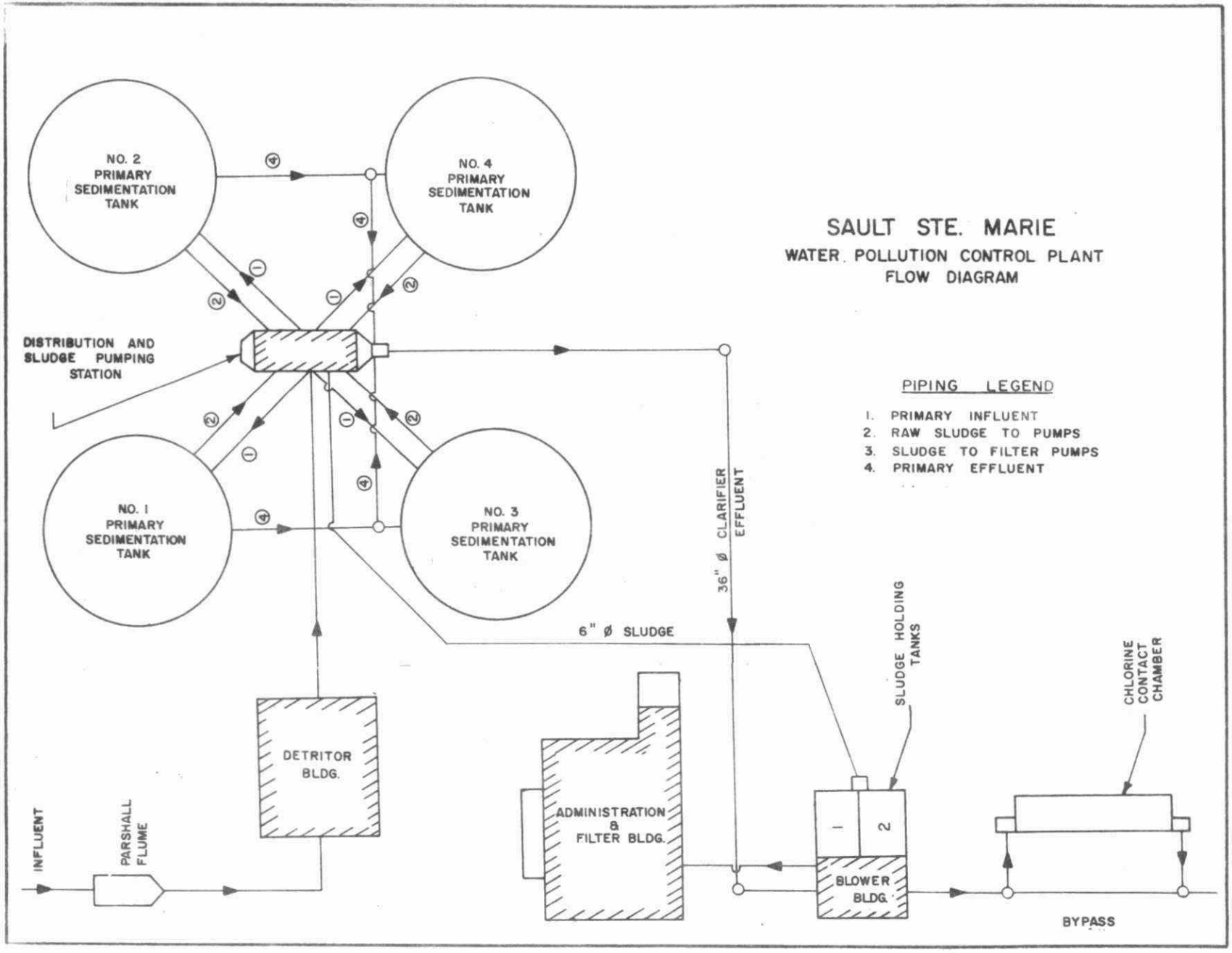
- to German Mills Creek

SLUDGE HANDLING

Digestion System - two-stage

Primary --
Type: Walker, 1 draft tube
Size: One 50' dia x 20' swd (39,200 ft^3 or 0.245 mil gal)

Secondary--
Type: Dorr (has one draft tube)
Size: One 30' dia x 19' swd (13,400 ft^3 or 83,500 gal)


NO. 2 PRIMARY SEDIMENTATION TANK
NO. 4 PRIMARY SEDIMENTATION TANK
NO. 1 PRIMARY SEDIMENTATION TANK
NO. 3 PRIMARY SEDIMENTATION TANK
DISTRIBUTION AND SLUDGE PUMPING STATION
SAULT STE. MARIE
WATER POLLUTION CONTROL PLANT
FLOW DIAGRAM
PIPING LEGEND
1. PRIMARY INFLUENT
2. RAW SLUDGE TO PUMPS
3. SLUDGE TO FILTER PUMPS
4. PRIMARY EFFLUENT
36" Ø CLARIFIER EFFLUENT
6" Ø SLUDGE
SLUDGE HOLDING TANKS
CHLORINE CONTACT CHAMBER
DETRITOR BLDG.
ADMINISTRATION & FILTER BLDG.
BLOWER BLDG.
1
2
INFLUENT
PARSHALL FLUME
BYPASS

DESIGN DATA

PROJECT NO.	2-0020-58
TREATMENT	Primary
DESIGN FLOW	8.0 mgd
DESIGN POPULATION	72,500
BOD - Raw Sewage	250 mg/l
- Removal	35%
SS - Raw Sewage	200 mg/l
- Removal	60%

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: Two Model C (36")

Grit Removal

Type: Dorr detritor
Size: Two 18' x 18' x 1'3"
(6,240 gal)
Retention: 1.13 min
Flow Velocity: 0.209 fps

Primary Sedimentation

Type: Dorr
Size: Four 70' dia x 8' swd
(900,000 gal)
Retention: 2.3 hr
Loading: Surface, 520 gal/ft^2/day
Weir, 13,000 gal/ft/day

CHLORINATION

Type: W & T
Size: One 800 lb/day

Chlorine Contact Chamber

Size: One 60' x 20' x 12'
Reten (90,000 gal)
Retention: 16.2 min

OUTFALL

- to St. Mary's River

SLUDGE HANDLING

Holding Tank - Aerated

Size: Two 24' x 15' x 11½'
(8,280 cu ft or 51,600 gal)
Air Supply: One Sutorbilt

Vacuum Filter

Type: Komline-Sanderson
Size: Two 200 sq ft

PUMPING STATIONS

Pim Street Pumping Station

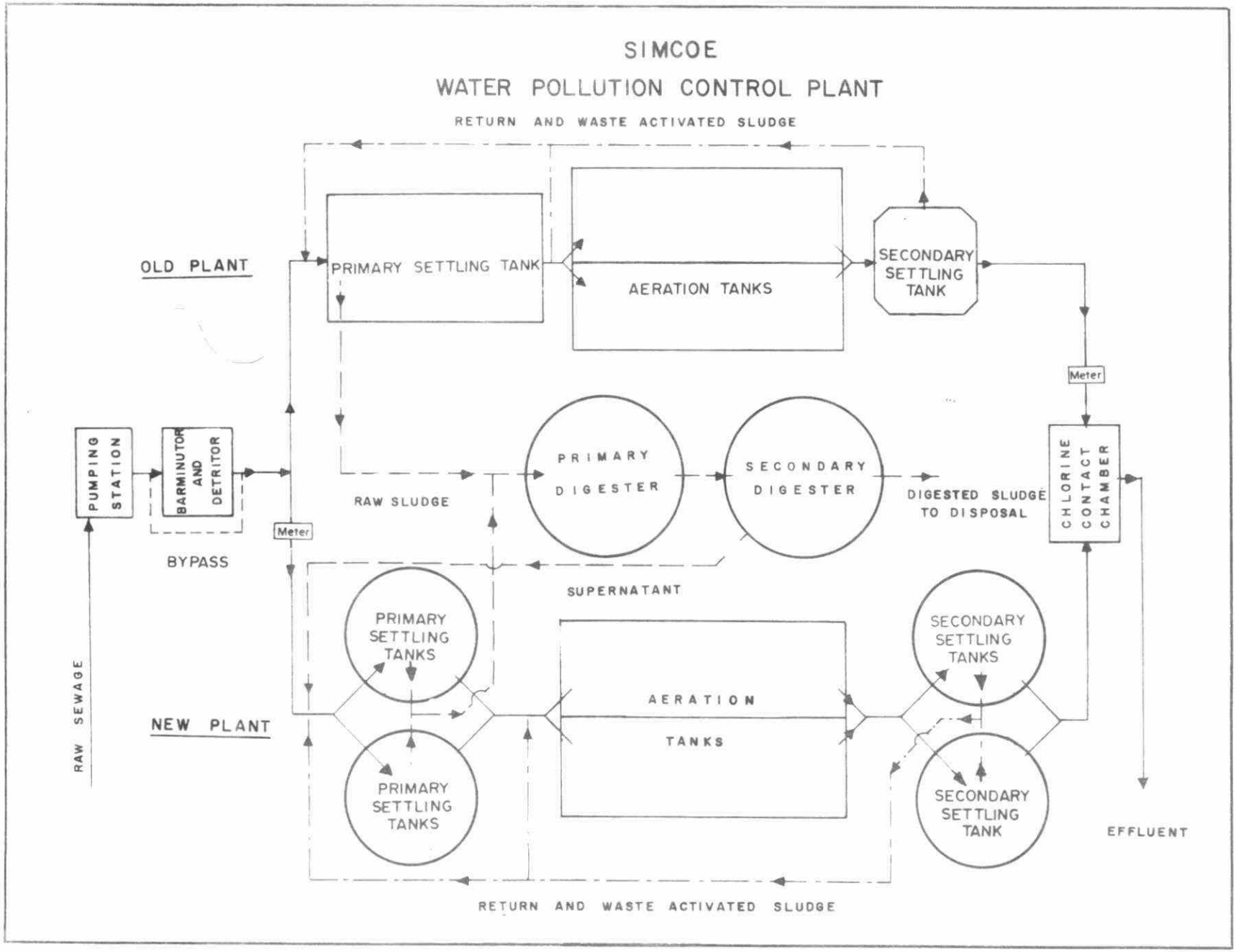
Type: Worthington
Size: One 10,000 gpm @ 50' tdh
(diesel)
Two 6,300 gpm @ 40' tdh
(electric)

Clark Creek Pumping Station

Type: Worthington
Size: One 12320 gpm (electric)
One 13000 gpm (diesel)
Two 7000 gpm (electric)
One diesel generator

Wiita Pumping Station (Temporary)

Type: Smart-Turner
Size: 2400 gpm @ 30' tdh (electrical)


SIMCOE
WATER POLLUTION CONTROL PLANT
RETURN AND WASTE ACTIVATED SLUDGE
OLD PLANT
PRIMARY SETTLING TANK
AERATION TANKS
SECONDARY SETTLING TANK
Meter
PUMPING STATION
BARMINUTOR AND DETRITOR
RAW SLUDGE
PRIMARY DIGESTER
SECONDARY DIGESTER
DIGESTED SLUDGE TO DISPOSAL
CHLORINE CONTACT CHAMBER
Meter
BYPASS
SUPERNATANT
RAW SEWAGE
NEW PLANT
PRIMARY SETTLING TANKS
AERATION TANKS
SECONDARY SETTLING TANKS
PRIMARY SETTLING TANKS
SECONDARY SETTLING TANK
EFFLUENT
RETURN AND WASTE ACTIVATED SLUDGE

DESIGN DATA

PROJECT NO.	2-0120-62
TREATMENT	Activated Sludge
DESIGN FLOW	2.0 mgd
DESIGN POPULATION	15,400
BOD - Raw Sewage	220 mg/l
- Removal	90%
SS - Raw Sewage	230 mg/l
- Removal	90%

COMMON

RAW SEWAGE PUMPS

a) Type: Fairbanks-Morse
Size: One 1200 gpm @ 35' tdh

b) Type: Smart-Turner
Size: One 500 gpm @ 35' tdh

c) Type: Worthington
Size: Two 2000 gpm @ 50' tdh

PRETREATMENT (Common)

Grit Removal

Type: Dorr Detritor
Size: One 14' x 14' x 1½' (1,850 gal)
Retention: 1.33 min

Comminution

Type: Barminutor
Size: Model "C" (24")

PLANT #1 (0.6 mgd)

PRIMARY TREATMENT

Primary Sedimentation

Type: Hardinge
Size: One 50' x 20' x 8' (50,000 gal)
Retention: 4.31 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 30,000 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Four pass
Size: 8 - 12' x 50' x 8' (240,000 gal)
Retention: 9.6 hr

Diffusers

Type: Holes in pipe & spargers

Air Supply

Type: Roots-Connersville
Size: Two 1200 scfm

Secondary Sedimentation

Type: Dorr
Size: One 46' (hex) x 9½' swd (98,600 gal)
Retention: 3.16 @ design flow with 25% return sludge
Loading: Surface, 360 gal/ft^2/day
Weir, 4150 gal/ft/day

CHLORINATION

Type: W & T
Size: One 400 lb/day

Chlorine Contact Chamber

Size: One 18' x 14¼' x 6' (6,800 gal)
Retention: 16.4 min

PLANT #2 (1.4 mgd)

PRIMARY TREATMENT

Primary Sedimentation

Type: Dorr
Size: Two 45' dia x 10' swd (198,000 gal)
Retention: 3.4 hr
Loading: Surface, 440 gal/ft^2/day
Weir, 5570 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 98' x 25' x 12½' (369,150 gal)
Retention: 6.3 hr

Diffusers

Type: Inka

Air Supply

Type: Dorr
Size: Two 5508 scfm

Secondary Sedimentation

Type: Dorr
Size: Two 45' dia x 10' swd (198,000 gal)
Retention: 3.4 hr
Loading: Surface, 440 gal/ft^2/day
Weir, 5570 gal/ft/day

CHLORINATION

Chlorine Contact Chamber

Size: 15' x 20.6' x 8.2' (15,700 gal)
Retention: 16 min

OUTFALL (Common)

- to Lynn River

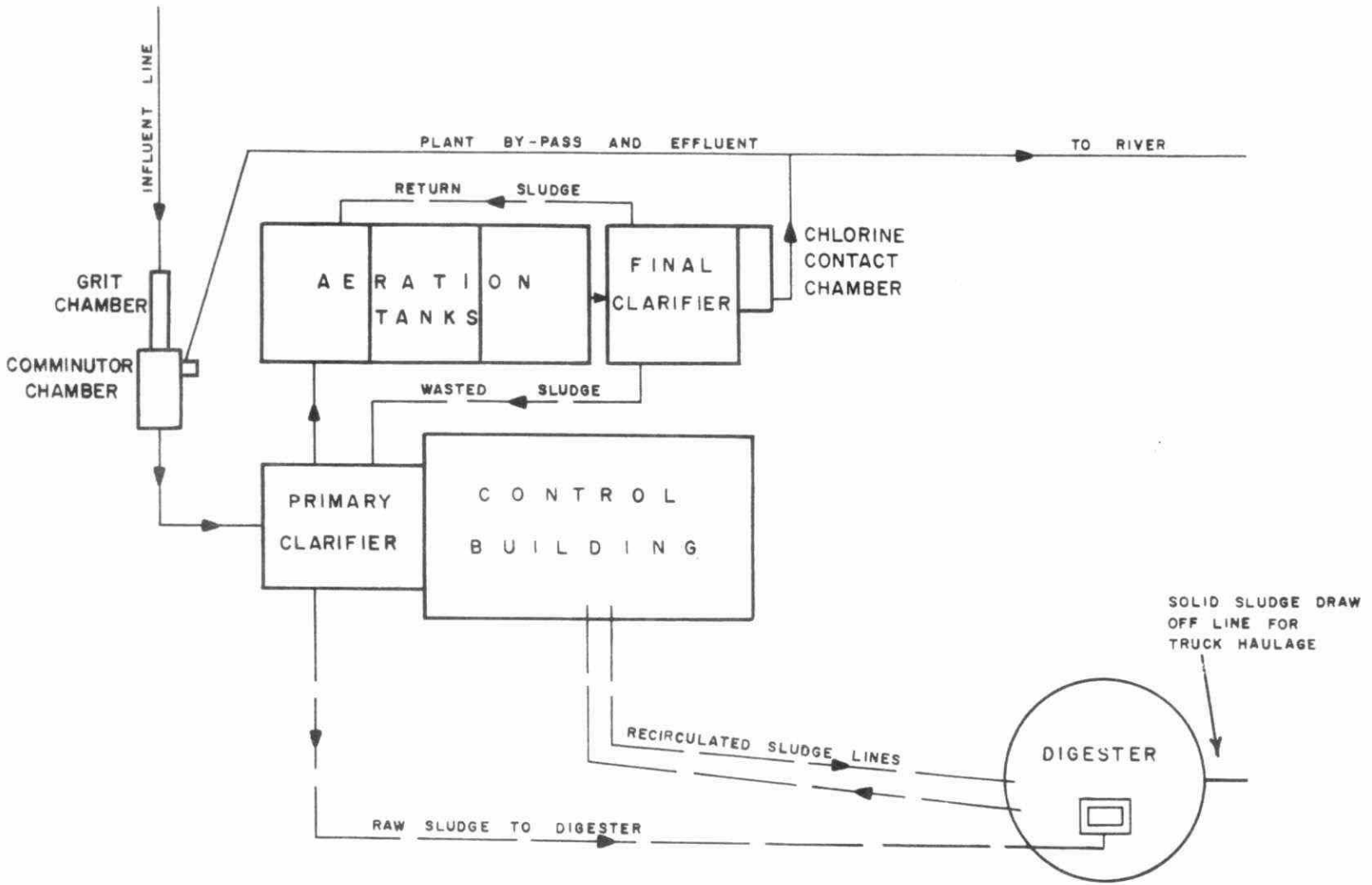
SLUDGE HANDLING (Common)

Digestion System - two-stage

Primary --
Type: PFT; gas mixed (Pearth floating cover)
Size: One 50' dia x 20' swd (43,250 cu ft or 270,000 gal)
Loading: 2.86 lb/cu ft/mo

Secondary --
Type: PFT
Size: One 50' dia x 20' swd (43,250 cu ft or 270,000 gal)
Total Loading: 1.43 lb/cu ft/mo

SIDNEY - BATAWA W P C P
FLOW CHART



DESIGN DATA

PROJECT NO.	2-0121-62
TREATMENT	Activated Sludge
DESIGN FLOW	0.12 mgd
DESIGN POPULATION	1,500
BOD - Raw Sewage	220 mg/l
- Removal	90%
SS - Raw Sewage	250 mg/l
- Removal	90%

PRIMARY TREATMENT

Grit Removal

Type: Channels, manually cleaned
Size: Two 9' 3" x 9" x 6" swd
Flow Velocity: 0.6 fps
Retention: 16.6 sec

Comminution

- One Chicago Pump, Model 10A

Screening

One $1\frac{1}{2}$" c-c on comminutor bypass
One $1\frac{1}{2}$" c-c on plant bypass

Primary Sedimentation

Size: One 16' x 16' x 11' swd
(9,130 gal)
Retention: 1.83 hr
Loading: Surface, 468 gal/ft^2/day
Weir, 3750 gal/ft/day

SECONDARY TREATMENT

Type: Diffused air; three-pass
Size: One 30' x 20' x 10' swd
(37,400 gal)
Retention: 7.5 hr

Diffusers: Ceramic Tubes

Spacing: 9 per pass (2 passes)
12 per pass (1 pass)

Air Supply

Type: Sutorbilt
Size: Two 140 scfm @ 6 psi

Secondary Sedimentation

Type: Falk
Size: One 20' x 12' x 10' swd
(15,000 gal)
Retention: 3.0 hr
Loading: Surface, 500 gal/ft^2/day
Weir, 5000 gal/ft/day

CHLORINATION

Type: Advance
Size: 50 lb/day

Chlorine Contact Chamber

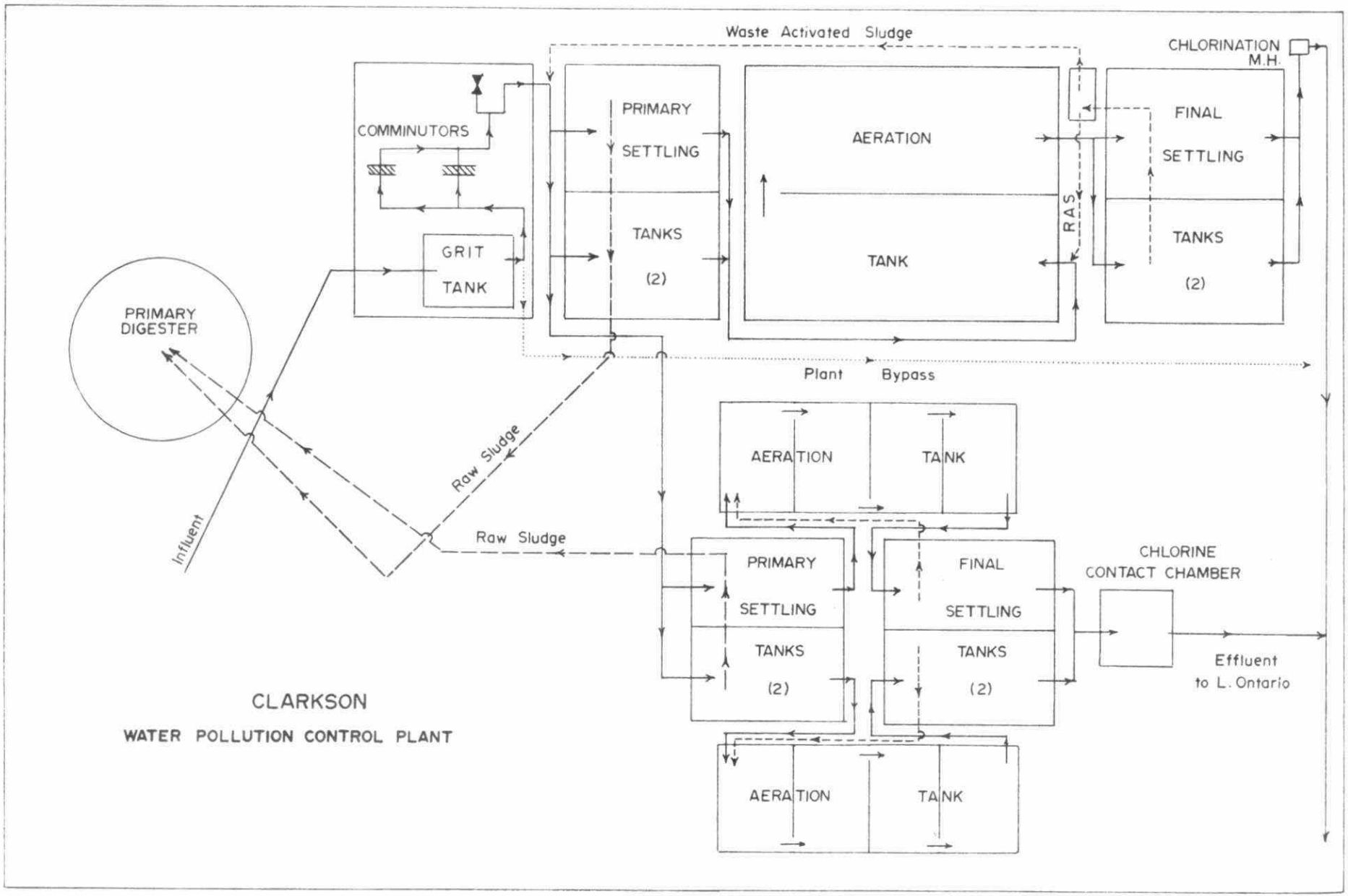
Size: One 10' x 4' x 8' (2,000 gal)
Retention: 24 min

OUTFALL

- to Trent River

SLUDGE HANDLING

Type: Fixed cover, integral heat exchanger coils
Size: One 20' dia x 17' 4"
(6,000 cu ft or 37,500 gal)
Loading: 1.5 lb/cu ft/mo


Waste Activated Sludge
CHLORINATION M.H.
COMMINUTORS
PRIMARY SETTLING TANKS (2)
AERATION TANK
RAS
FINAL SETTLING TANKS (2)
GRIT TANK
PRIMARY DIGESTER
Plant Bypass
Raw Sludge
Influent
Raw Sludge
AERATION TANK
PRIMARY SETTLING TANKS (2)
FINAL SETTLING TANKS (2)
CHLORINE CONTACT CHAMBER
Effluent to L. Ontario
AERATION TANK
CLARKSON
WATER POLLUTION CONTROL PLANT

DESIGN DATA

Design flow (old plant) 1.00 mgd
(new plant) 1.25 mgd (total) 2.25 mgd.

GRIT REMOVAL (common):
Type: Aerated, grit removal by clamshell bucket (sized for 6 mgd)
Size: One 24'3" x 19'9" x ca. 11'6"
Volume: 5600 ft^3 or 35,000 gal.
Detention time: 22.4 min. @ 2.25 mgd.

COMMINUTION: (common)
Type: Two 24" C.P. Barminutors

OLD PLANT (WEST):
Primary Sedimentation
Size: Two 42'6" x 16'0" x 13'0"
Volume: 17,700 ft^3 (total) or 110,000 gal.
Detention: 2.65 hr. @ 1.0 mgd
Hydraulic Loading: Surface 735 gpd/ft^2. Weir: 15,650 gpd/ft

AERATION:
Type: 4-pass tanks, diffused air - Spargers
Size: Two tanks 31'0" x 18'0" x 12' (each pass)
Volume: 53,600 ft^3 (total) or 0.334 mg.
Detention: 8.0 hr. @ 1.0 mgd
Air Supply:

SECONDARY SEDIMENTATION:
Size: Two 52'0" x 16'0" x 12'0"
Volume: 20,000 ft^3 (total) or 0.125 mg.
Detention: 3.0 hr. @ 1.0 mgd
Leading: Surface, 600 gpd/ft^2 Weir: 7,590 gpd/ft.

CHLORINE CONTACT CHAMBER:
Volume: 196 ft^3 or 1200 gal.
Detention: 1.7 minutes

DIGESTION: (not in use)
Type: Single stage, fixed concrete roof, mixed by recirculation
Size: One 45'0" dia. x 22'0" swd
Volume: 35,000 ft^3 (assuming 20.2 ft. depth) or 218,000 gal.

NEW PLANT (EAST):
Primary Sedimentation
Size: Two 60'0" x 14'0" x 10'0"
Volume: 16,800 ft^3 (total) or 0.105 mg.
Detention: 2.01 hr. @1.25 mgd
Loading: Surface, 745 gpd/ft^2 Weir 8960 gpd/ft

AERATION:
Type: Two pass, diffused air - FLEXOFUSERS
Size: One tank 120' x 18' x 11.25' (each pass)
Volume: 48600 ft^3 or 0.303 m.g.
Detention: 5.8 hr. @ 1.25 m.g.d.
Air supply: 3 blowers, 1400 scfm, 1700 scfm 2150 scfm (7.5 psig)

SECONDARY SEDIMENTATION:
Size: Two 74'0" x 14'0" x 10'9"
Volume: 22,200 ft^3 (total) or 0.137 gal.
Detention: 2.64 hr. @ 1.25 m.g.d.
Loading: Surface 563 gpd/ft^2 Weir: 7440 gpd/ft.

CHLORINATION - in manhole

DIGESTION:
Type: Single stage, concrete fixed roof - mixed by gas
Size: One 55' dia. x 20' (liquid depth, sw)
Volume: 52,400 ft^3 or 0.327 mg.

DESIGN DATA

Nominal Capacity: 400, 000 gpd (imp)

COMMINUTION:

GRIT REMOVAL:

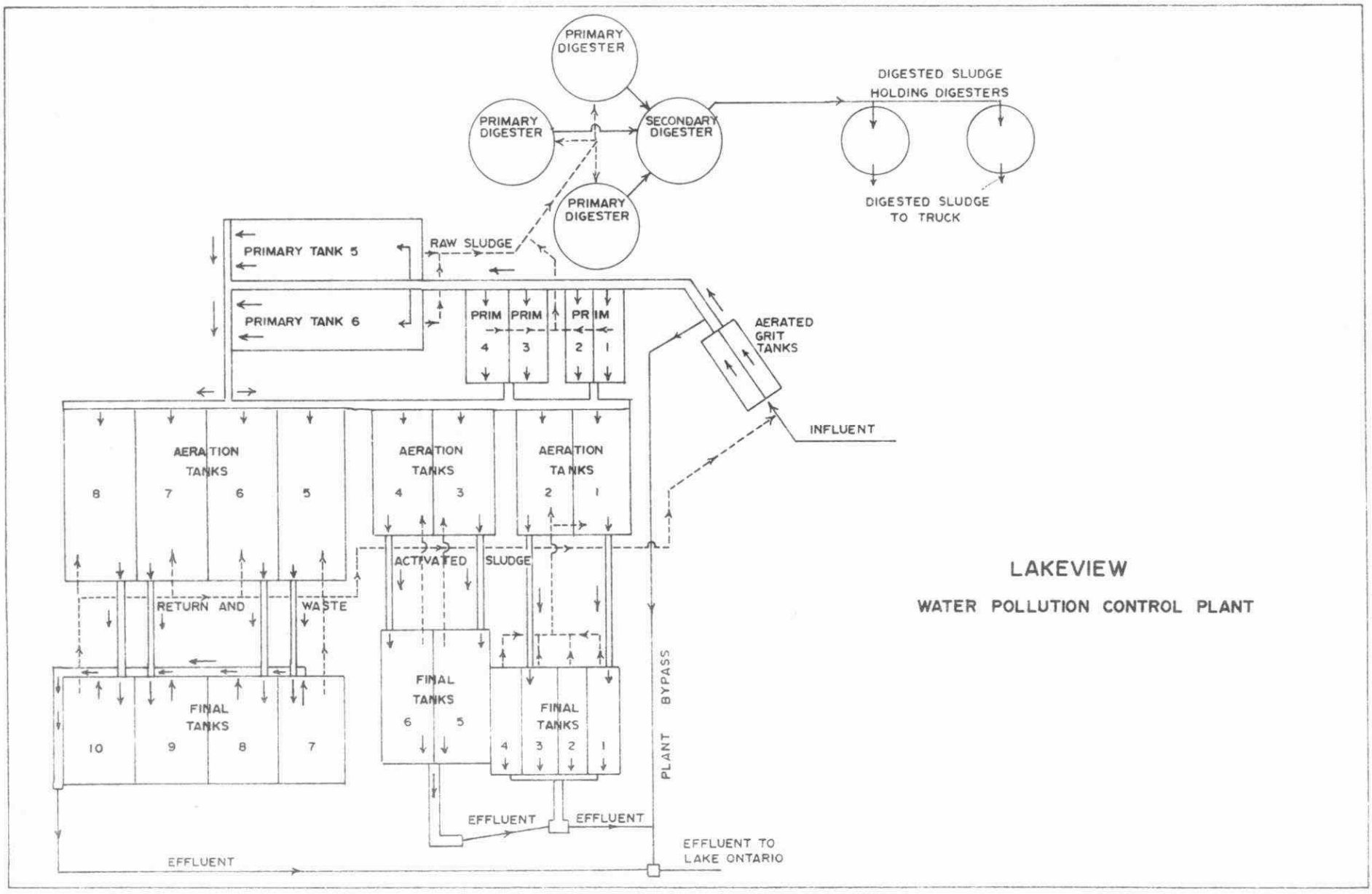
PRIMARY SEDIMENTATION:
Size: Two 20' x 16' x 10'
Volume: 6400 ft^3 or 40, 000 gal. Detention: 2.4 hours
Loading: Surface 625 gpd/ft^2 Weir

AERATION:
Type: Diffused air
Size: Two 70' x 16' x 10'
Volume: 22, 400 ft^3 or 140, 000 gal Detention: 8.4 hours
Diffusers:

SECONDARY SEDIMENTATION:
Size: Two 35' x 16' x 10'
Volume: 11, 200 ft^3 or 70, 000 gal Detention: 4.2 hours
Loading: Surface 357 gpd/ft^2 Weir

CHLORINE CONTACT CHAMBER:
Size: One 25' x 12' x 6'
Volume: 1800 ft^3 or 11200 gal. Detention: 40 min.

DIGESTION:
Type: Single stage
Size: One 50' dia. x 19' swd
Volume: 39, 600 ft^3 or 247, 000 gal.


PRIMARY DIGESTER
PRIMARY DIGESTER
SECONDARY DIGESTER
PRIMARY DIGESTER
DIGESTED SLUDGE HOLDING DIGESTERS
DIGESTED SLUDGE TO TRUCK
PRIMARY TANK 5
PRIMARY TANK 6
RAW SLUDGE
PRIM 4
PRIM 3
PRIM 2
PRIM 1
AERATED GRIT TANKS
INFLUENT
AERATION TANKS 8 7 6 5
AERATION TANKS 4 3
AERATION TANKS 2 1
ACTIVATED SLUDGE
RETURN AND
WASTE
FINAL TANKS 10 9 8 7
FINAL TANKS 6 5
FINAL TANKS 4 3 2 1
PLANT BYPASS
EFFLUENT
EFFLUENT
EFFLUENT
EFFLUENT TO LAKE ONTARIO
LAKEVIEW
WATER POLLUTION CONTROL PLANT

DESIGN DATA

SOUTH PEEL - LAKEVIEW WPCP

TYPE: CONVENTIONAL ACTIVATED SLUDGE

DESIGN FLOW 37.5 MIGD
DESIGN BOD 300 mg/l
DESIGN S.S. 350 mg/l

PRETREATMENT
- Grit Removal
  Aerated tanks
  Two 106' x 21' x 13.5'
  Total vol. 375,000 gal.
  Air supply 4.2 - 6 cfm

- Screening
  Mechanical front cleaned screens
  Two with 3/4" openings in 7' channels

PRIMARY SEDIMENTATION

Two 87' x 32' x 12'
Two 87' x 48' x 12'
Two 214' x 65' x 12'
Total vol: 3.12 MG
Detention Time: 2 hr.
Overflow rate 900 gpd/ft^2

SECONDARY TREATMENT
- Aeration Tanks
  Diffused air; SPARGERS
  Two 3-pass tanks, 144' x 63' x 14.3'
  Two 3-pass tanks, 144' x 60' x 15'
  Two 4-pass tanks, 216' x 80' x 14'
  Total volume: 9.28 MG
  Detention time: 5.9 hr.
  Air supply: Three BROWN-BOVERI
  each 30,000 cfm

- Secondary Sedimentation
  Four 87' x 32' x 12'
  Two 104' x 48' x 12'
  Four 140' x 79' x 12'
  Total volume: 4.93 MG
  Detention time: 3.2 hr.
  Overflow rate: 575 gpd/ft^2

CHLORINATION

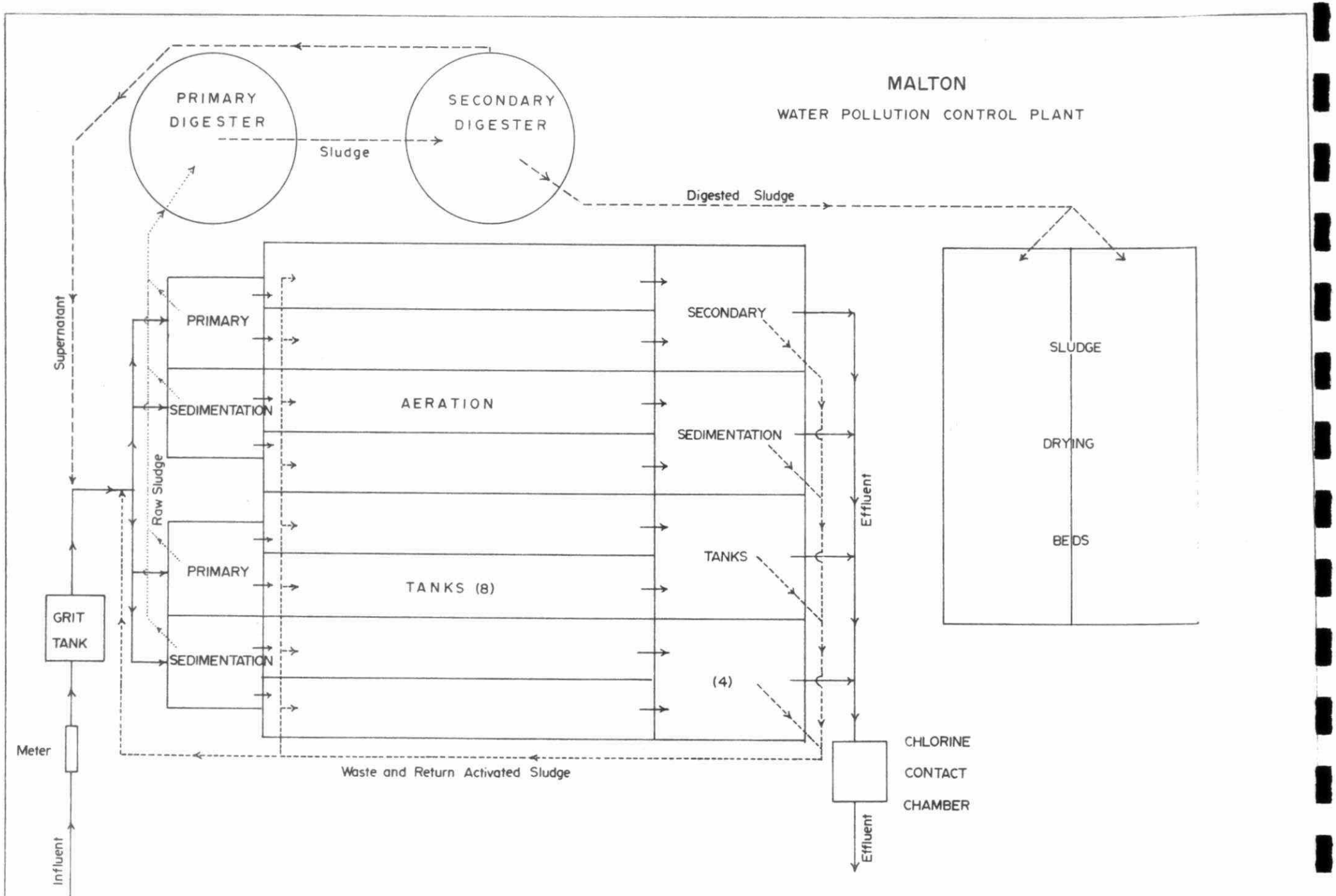
One F & P 2000 lb/day cap.
Three W & T 2000 lb/day cap.
Supply: rail tank cars.

SLUDGE HANDLING
- Primary Digesters
  Fixed roof, mixed by gas recirculation
  Three 100' dia. x 30.5' swd
  Total volume 7.88000 ft^3 or 4.9 MG

- Secondary Digesters
  Fixed concrete roof
  One 100' dia x 30.5 swd
  Volume: 262,000 ft^3 or 1.64 MG

- Holding Digesters
  Fixed concrete roof
  Two 80' dia x 25.5' swd
  Total volume: 256,000 ft^3 or 1.60 MG

(NOTE: Two tanks 65' dia x 25' swd not in use)


MALTON
WATER POLLUTION CONTROL PLANT
PRIMARY DIGESTER
SECONDARY DIGESTER
Sludge
Digested Sludge
Supernatant
PRIMARY
SEDIMENTATION
AERATION
TANKS (8)
PRIMARY
SEDIMENTATION
Raw Sludge
SECONDARY
SEDIMENTATION
TANKS
(4)
Effluent
SLUDGE
DRYING
BEDS
GRIT TANK
Meter
Influent
Waste and Return Activated Sludge
CHLORINE CONTACT CHAMBER
Effluent

DESIGN DATA

Design flow: 0.75 mgd

GRIT REMOVAL:
Type: Aerated, grit removed by airlift
Size:
Volume:
Detention:

COMMINUTION: not provided

PRIMARY SEDIMENTATION:
Size Four 16' x 16' x 10' swd (DORR SQUAREX)
Volume: 10,200 ft^3 (total) or 63,600 gal.
Detention: 2.04 hr. @ 0.75 M.G.
Loading: Surface 735 gpd/ft^2 Weir: 4080 gpd/ft.

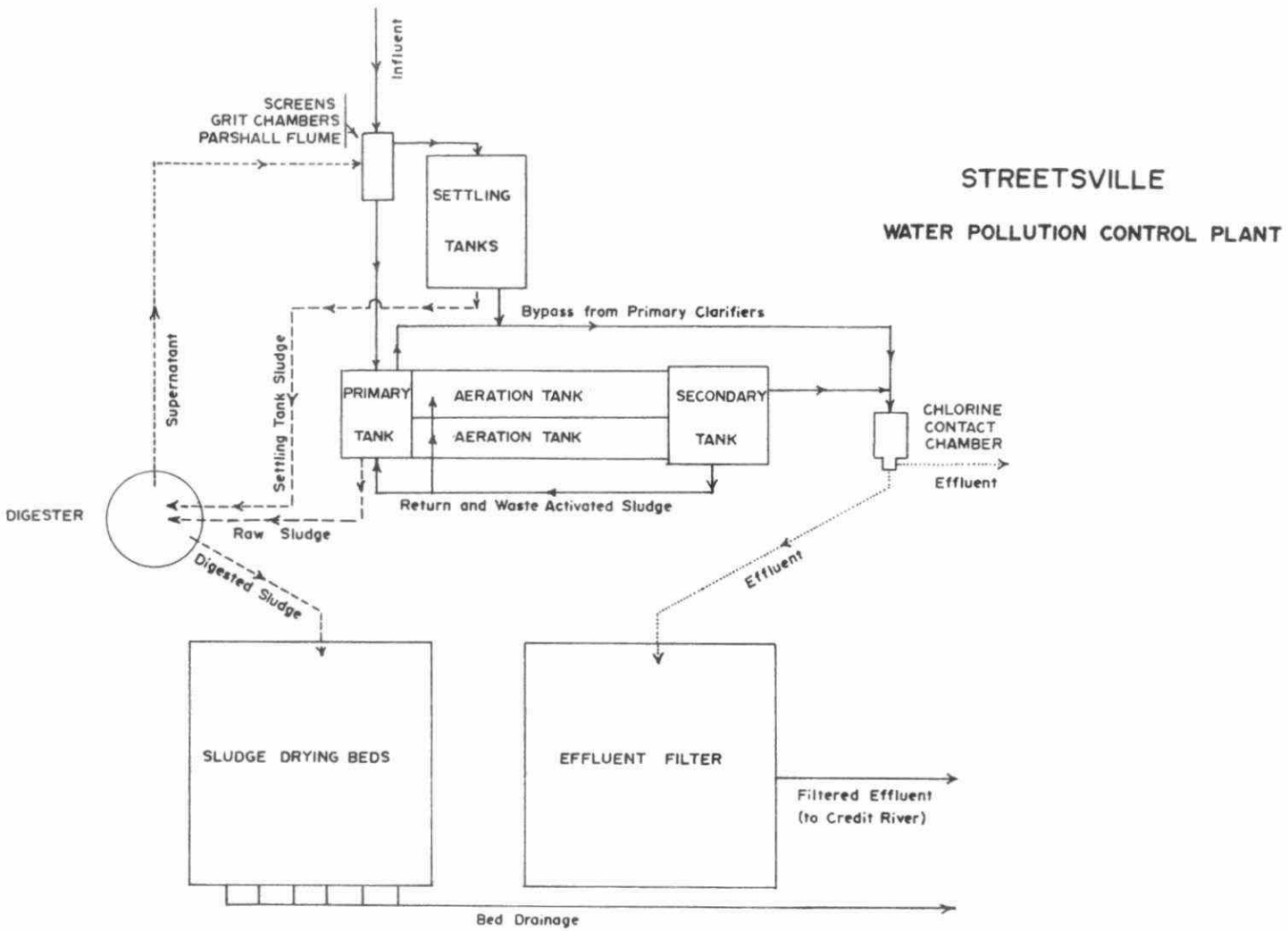
AERATION:
Type: Single pass, diffused air
Size: Eight 58' x 9' x 9'
Volume: 37,600 ft^3 or 0.234 M.G.
Detention: 7.5 hr. @ 0.75 M.G.
Air Supply

SECONDARY SEDIMENTATION:
Size: Four 19' x 19' x 10' swd (DORR SQUAREX)
Volume: 14,400 ft^3 or 89,900 gal.
Detention: 2.88 fr. @ 0.75 M.G.
Loading: Surface 520 gpd/ft^2 Weir: 2930 gpd/ft.

CHLORINE CONTACT CHAMBER:
Volume:
Detention:

DIGESTION:
Type: Two stage
a) Primary
Type: DORR draft tube mixers
Size: One 40' dia. x 23' swd.
Volume: 32,000 $ft.^3$ or 0.200 M.G.

b) Secondary
Type:
Size: One 40' dia. x 23' swd
Volume: 32,000 $ft.^3$ or 0.200 M.G.


STREETSVILLE
WATER POLLUTION CONTROL PLANT
Influent
SCREENS
GRIT CHAMBERS
PARSHALL FLUME
SETTLING
TANKS
Bypass from Primary Clarifiers
Supernatant
Settling Tank Sludge
PRIMARY
TANK
AERATION TANK
AERATION TANK
SECONDARY
TANK
CHLORINE
CONTACT
CHAMBER
Effluent
DIGESTER
Raw Sludge
Return and Waste Activated Sludge
Digested Sludge
Effluent
SLUDGE DRYING BEDS
EFFLUENT FILTER
Filtered Effluent
(to Credit River)
Bed Drainage

DESIGN DATA

Design flow 0.80 mgd Design Population 8,000
BOD - Raw Sewage 240 mg/1
- Removal 90-95%
SS - Raw Sewage 260 mg/1
- Removal 90%

PRIMARY TREATMENT

Screening:
Type: Manually cleaned bar screens
Size: Two with 2" c-c

Grit Removal:
Type: Channels
Size: Two 18½' x 1½ wide
Retention: 0.43 minutes

Primary Sedimentation:
Type: DORR
Size: One 35' x 35' x 10' (76,500 gallons)
Retention: 2.3 hours
Loading: Surface, 650 gal/ft^2/ day
Weir, 6250 gal/ft / day

SECONDARY TREATMENT

Aeration Tanks:
Type: Diffused air; Single pass
Size: Two 104' x 17' x 12'
(42,500 cu. ft. or 264,000 gal.)
Retention: 7.9 hours

Diffusers:
Type: GEN. FILTRATION & ENGINEERING
FLO-RITE (96)

Air Supply:
Type: SUTORBILT
Size: Two 760 scfm

Secondary Sedimentation:
Type: DORR
Size: One 40' x 40' x 8' (80,000 gallons)
Retention: 2.4 hours
Loading: Surface, 625 gal/ft^2/day
Weir, 5400 gal/ft / day

CHLORINATION

Type: BIF Size: One 200 lb/day

Chlorine Contact Chamber:
Size: One 20' x 10' x 9' Retention: 20 minutes

OUTFALL

- to CREDIT RIVER

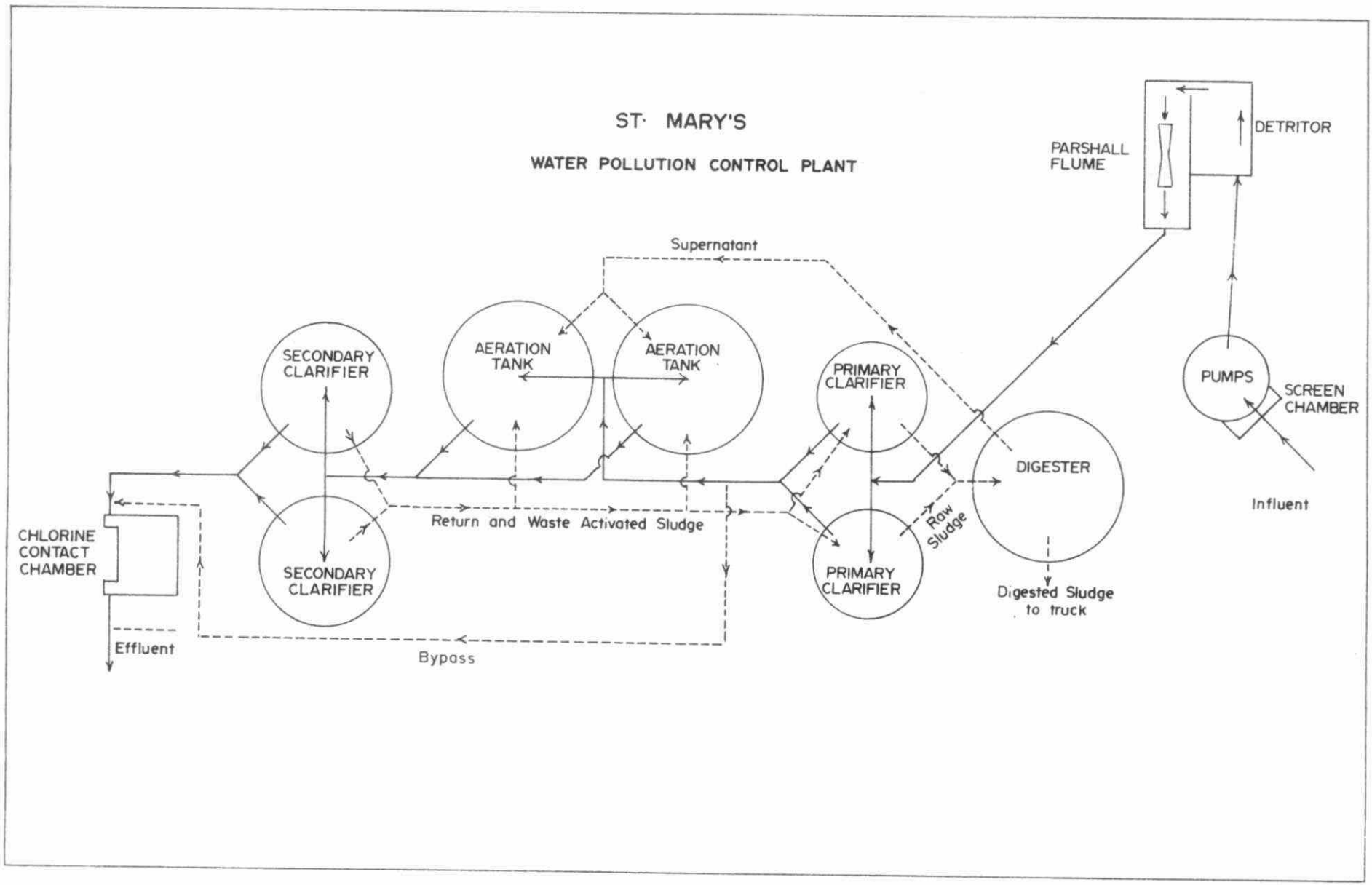
SLUDGE HANDLING

Digestion System - Singel Stage

Type: WALKER PROCESS (1 draft tube mixer)
Size: One 45' dia x 26½'
(36,000 cu. ft. or 224,000 gal.)
Loading: 1.5 lb/cu. ft./mon.

Sludge Drying Beds:

Two 100' x 50' (10,000 sq. ft.


ST. MARY'S
WATER POLLUTION CONTROL PLANT
PARSHALL FLUME
DETRITOR
Supernatant
SECONDARY CLARIFIER
AERATION TANK
AERATION TANK
PRIMARY CLARIFIER
PUMPS
SCREEN CHAMBER
DIGESTER
Influent
CHLORINE CONTACT CHAMBER
Return and Waste Activated Sludge
Raw Sludge
SECONDARY CLARIFIER
PRIMARY CLARIFIER
Digested Sludge to truck
Effluent
Bypass

DESIGN DATA

Design Capacity: 800, 000 IGPD

RAW SEWAGE PUMPING:
3 FLYGT Model CP-3200 submersible pumps
each rated 1000 USGPM at 40' TDH

COMMINUTOR:
Type - ECODYNE Mod 25R

SCREENING:
Bar Screen

DETRITOR:
Type - DORR-OLIVER Type WA. Cap. 3.8 M.G.D.

PRIMARY CLARIFIERS:
2, each 30.0' i.d. x 11.5' swd
Volume (total) 104540 I. gal. Detention: 3.1 hr.
Overflow rate: 560 gpd per sq. ft.
Raw Sludge Pumps: Type - CARTER

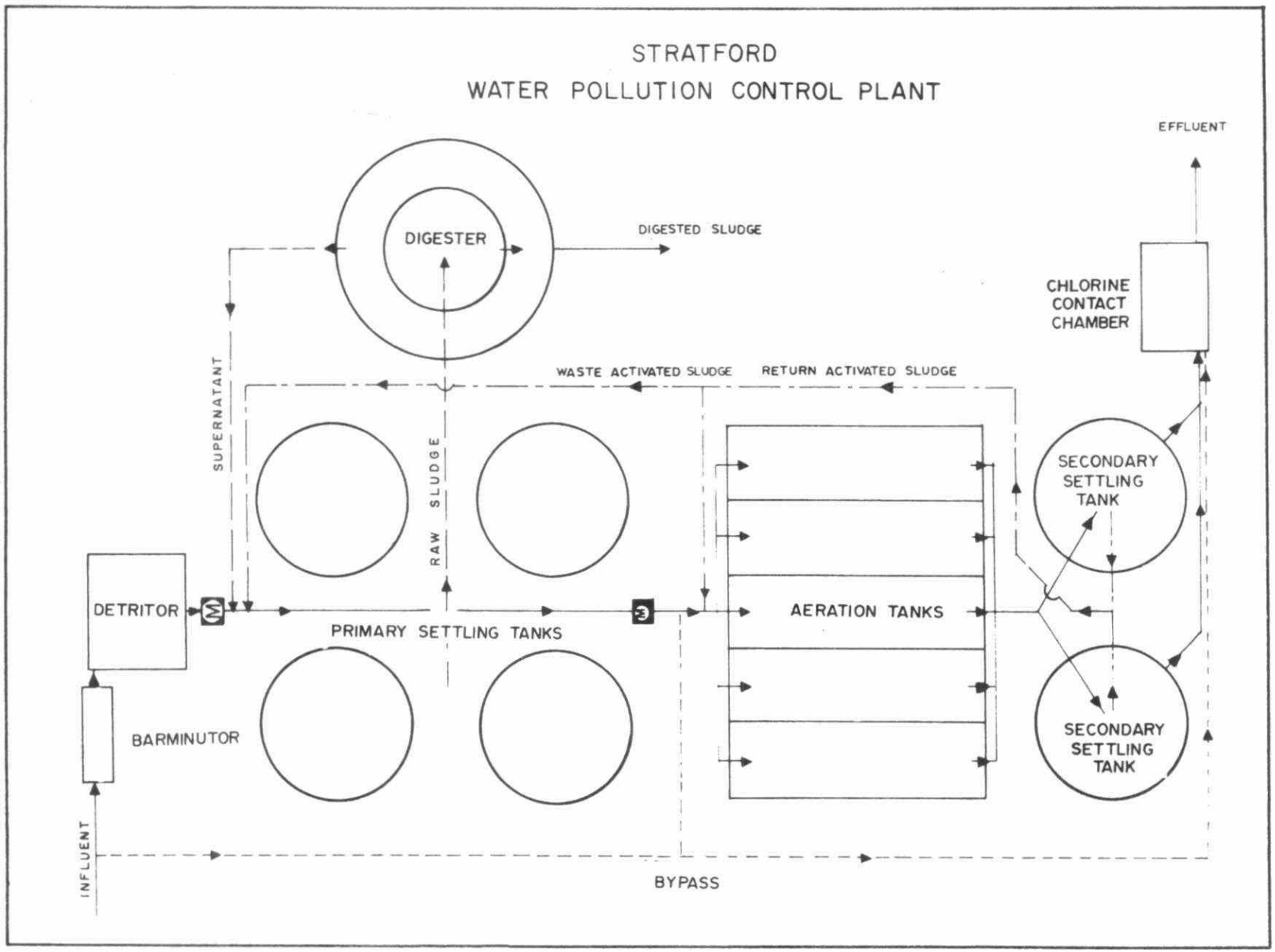
AERATION TANKS:
2, each 36.0' i.d. x 15.0' swd
Volume (total) 190, 620 I. gal. Detention: 5.7 hr.
Aerators: Type AMES-CROSTA
Return Sludge Pumps: 2 SMART-TURNER Model 3 WPCS

SECONDARY CLARIFIERS:
2, each 35.0' i.d. x 10.0' swd
Volume (total) 120, 947 I.G. Detention: 3.5 hr.
Overflow Rate: 415 gpd per sq. ft.

CHLORINE CONTACT CHAMBER 4-pass:
2 passes 4.4' w x 13.0'1 x 9.5' swd
1 pass 4.8'w x 13.0'1 x 9.5' swd
1 pass 6.7'w x 13.0'1 x 9.5' swd
Volume (total) 1528 I.G. Detention: 29 min.

CHLORINATOR TYPE:
Wallace and Tiernan

PRIMARY DIGESTER:
one, 40.0' i.d. x 20.0' swd
Volume: 26650 cu. ft.


STRATFORD
WATER POLLUTION CONTROL PLANT
EFFLUENT
DIGESTER
DIGESTED SLUDGE
CHLORINE CONTACT CHAMBER
WASTE ACTIVATED SLUDGE
RETURN ACTIVATED SLUDGE
SUPERNATANT
RAW SLUDGE
SECONDARY SETTLING TANK
DETRITOR
AERATION TANKS
PRIMARY SETTLING TANKS
BARMINUTOR
SECONDARY SETTLING TANK
INFLUENT
BYPASS

DESIGN DATA

PROJECT NO.	2-0002-57
TREATMENT	Activated Sludge
DESIGN FLOW	6.0 mgd
DESIGN POPULATION	30,000
BOD - Raw Sewage	140 mg/l
- Removal	90%
SS - Raw Sewage	250 mg/l
- Removal	95%

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: One Model C (36')

Grit Removal

Type: Dorr detritor
Size: One 20' x 20' x 1' (2500 gal)
Retention: 0.9 min

Primary Sedimentation

Type: Infilco
Size: Four 80' dia x 10½' swd (1.32 mil gal)
NOTE: Two used for storm flows only
Retention: 2.7 hr (2 cl)
Loading: Surface, 600 gal/ft^2/day
Weir, 12,000 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; triple-pass
Size: Five 85½' x 25' 8" (avg) x 13' (0.97 mil gal)
Retention: 3.9 hr

Diffusers

Type: Activated Sludge Ltd. Alundum Domes

Air Supply

Type: Roots-Connersville
Size: Three 1750 cfm

Secondary Sedimentation

Type: Infilco
Size: Two 80' dia x 11' 3" swd (0.705 mil gal)
Retention: 2.7 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 12,000 gal/ft/day

CHLORINATION

Chlorine Contact Chamber

Size: 67' x 27' x 8' (90,000 gal)
Retention: 22 min

Chlorinator

One F & P 500 lb/day

OUTFALL

Avon River

SLUDGE HANDLING

Digestion System - Heated, two-stage

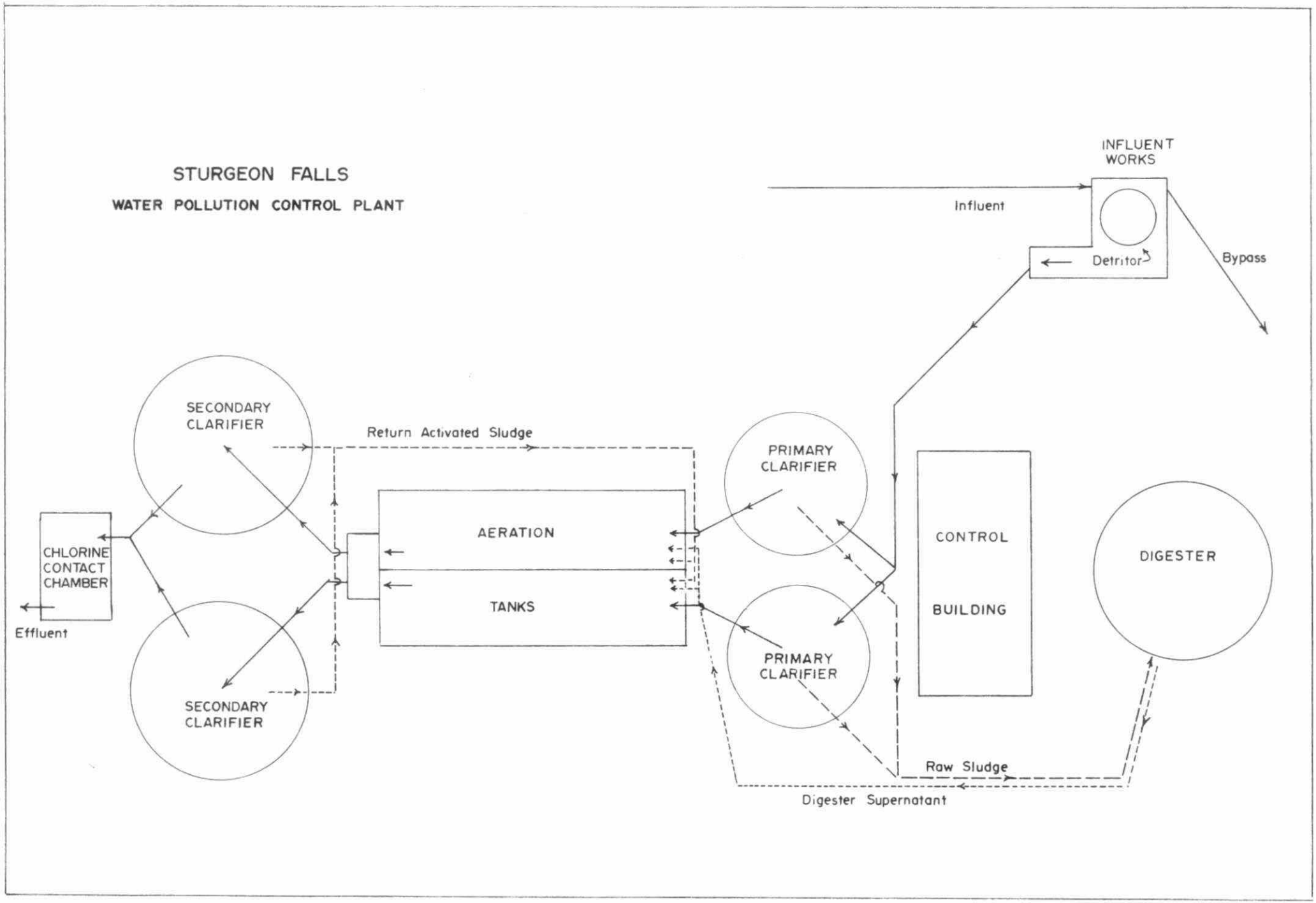
Type: Gas mixed
Size: One 73' dia x 26' swd (100,00 cu ft or 0.624 mil gal)

Primary Stage (inner)

Size: 67,600 cu ft
Loading: 2.8 lb/cu ft/mo

Secondary Stage (outer ring)

Size: 32,400 cu ft
Total Loading: 1.9 lb/cu ft/mo


STURGEON FALLS
WATER POLLUTION CONTROL PLANT
INFLUENT WORKS
Influent
Detritor
Bypass
SECONDARY CLARIFIER
Return Activated Sludge
PRIMARY CLARIFIER
CONTROL BUILDING
DIGESTER
CHLORINE CONTACT CHAMBER
AERATION TANKS
Effluent
SECONDARY CLARIFIER
PRIMARY CLARIFIER
Raw Sludge
Digester Supernatant

DESIGN DATA

Project No: 1-0012-66
Treatment: Conventional Activated Sludge
Design Flow: 1 MGD
BOD: Raw Sewage 180 mg/l
SS: Raw Sewage 200 mg/l

PUMPING STATIONS:
Two, prefabricated, each with 1250 IGPM pump
One, built in place, with DUPLEX Submersible
375 IGPM Pump

PRETREATMENT

DETRITOR:
One, 12' dia. x 1.6' awd
Volume: 1100 I. Gal Detention: 1.6 min.

COMMINUTOR:
Capacity: 4 MGD

BAR SCREENS:
in channel, after comminutor

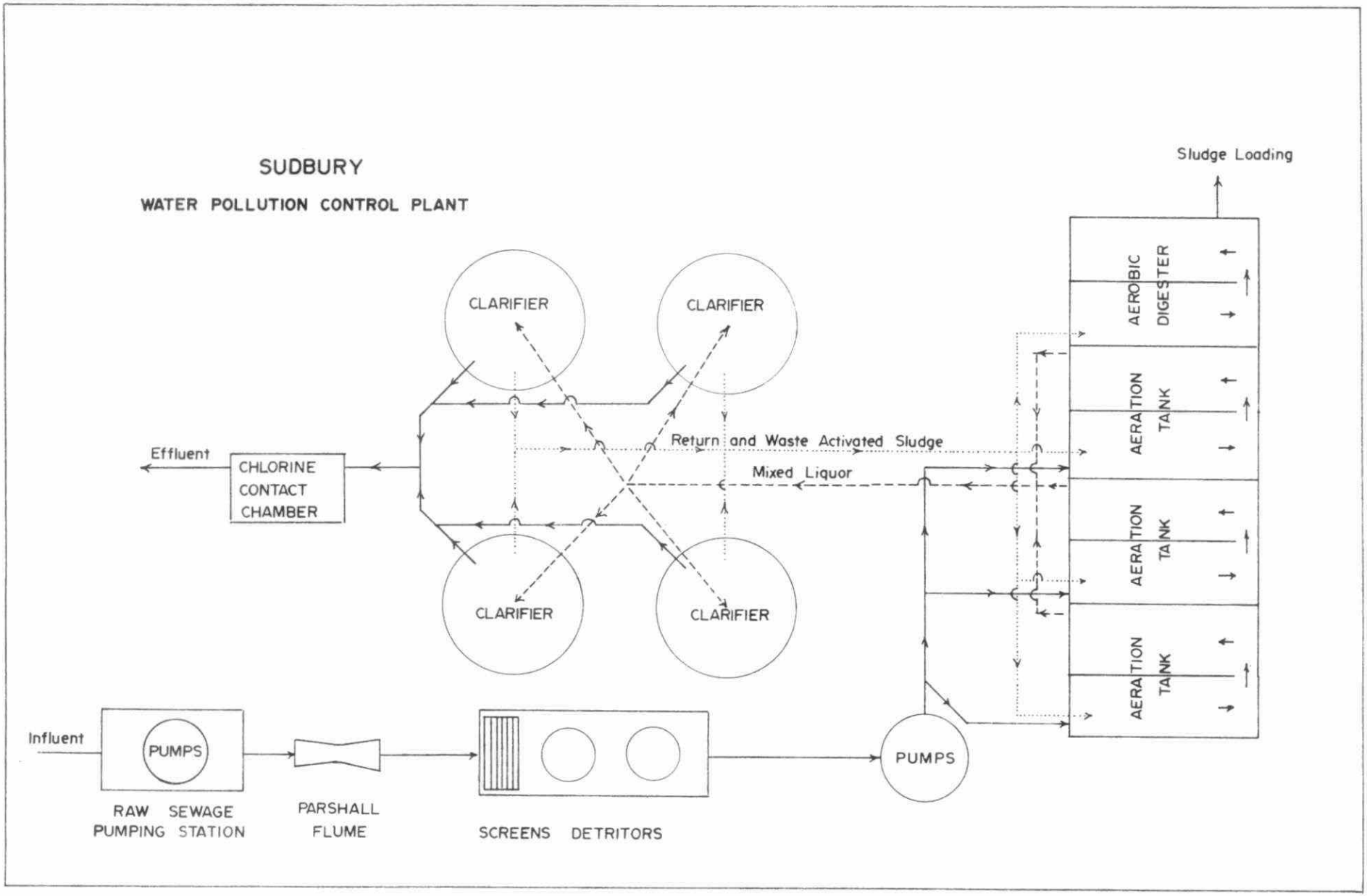
PRIMARY CLARIFIERS:
Two, 36' dia. x 10' swd
Volume: (total) 127,000 I. Gal.
Detention: 3.0 hours
Overflow rate: 490 I. Gal/ft^2/day

AERATION TANKS:
Two, 42' x 18' x 14' swd
Volume: (total) 132,000 I. Gal.
Detention: 3.2 hours
Blowers: two, each 4320 cfm

SECONDARY CLARIFIERS:
Two, 36' dia. x 10' swd
Volume: (total) 127,000 I. gal.
Detention: 3.0 hours
Surface overflow rate: 490 gal/ft^2/day.

DIGESTER:
45' dia. x 20' swd
Volume: 31800 ft^3

CHLORINE CONTACT CHAMBER:
Four passes, each 16' x 6.2' x 11.75' swd (avg)
Volume: 29000 I. Gal. Detention: 42 min.


SUDBURY
WATER POLLUTION CONTROL PLANT
Sludge Loading
AEROBIC DIGESTER
AERATION TANK
AERATION TANK
AERATION TANK
CLARIFIER
CLARIFIER
CLARIFIER
CLARIFIER
Return and Waste Activated Sludge
Mixed Liquor
Effluent
CHLORINE CONTACT CHAMBER
Influent
PUMPS
PUMPS
RAW SEWAGE PUMPING STATION
PARSHALL FLUME
SCREENS DETRITORS

DESIGN DATA

Design Flow: 15 MIGD
Design BOD 95 mg/l
Design SS 139 mg/l

RAW SEWAGE PUMPS
(at pumping station)
Three CANADA PUMPS: Type: 14 DSV,
Capacity: (each) 9000 USGPM at 93' TDH
Two CANADA PUMPS: Type: 10RSLV,
Capacity: 4400 USGPM at 94.5 TDH

BAR SCREENS:
Two, LINK-BELT Mechanical Bar Screens
4' x 6' Bars on 2.5" centres

DETRITOR
30' dia. x 2.2' swd
Type: DORR-OLIVER LONG

RAW SEWAGE PUMPS
(at plant)
Three, WORTHINGTON
Capacity (each) 13, 440 USGPM at 28' TDH

AERATION TANKS:
Three, 132.5' x 48' x 15' swd (2-pass)
Volume (total) 1, 786, 000 I. Gal.
Detention: 2.9 hours
Blowers: Four, SPENCER TURBO
Capacity each: 10, 400 ft^3/min. at 8.5 psi

FINAL CLARIFIERS
Four, 110' dia. x 12.5' swd
Mechanism: DORR-OLIVER LONG
Volume: (total) 3, 000, 000 I. Gal.
Detention: 4.7 hours
Surface overflow rate: 416 gal/ft^2/day

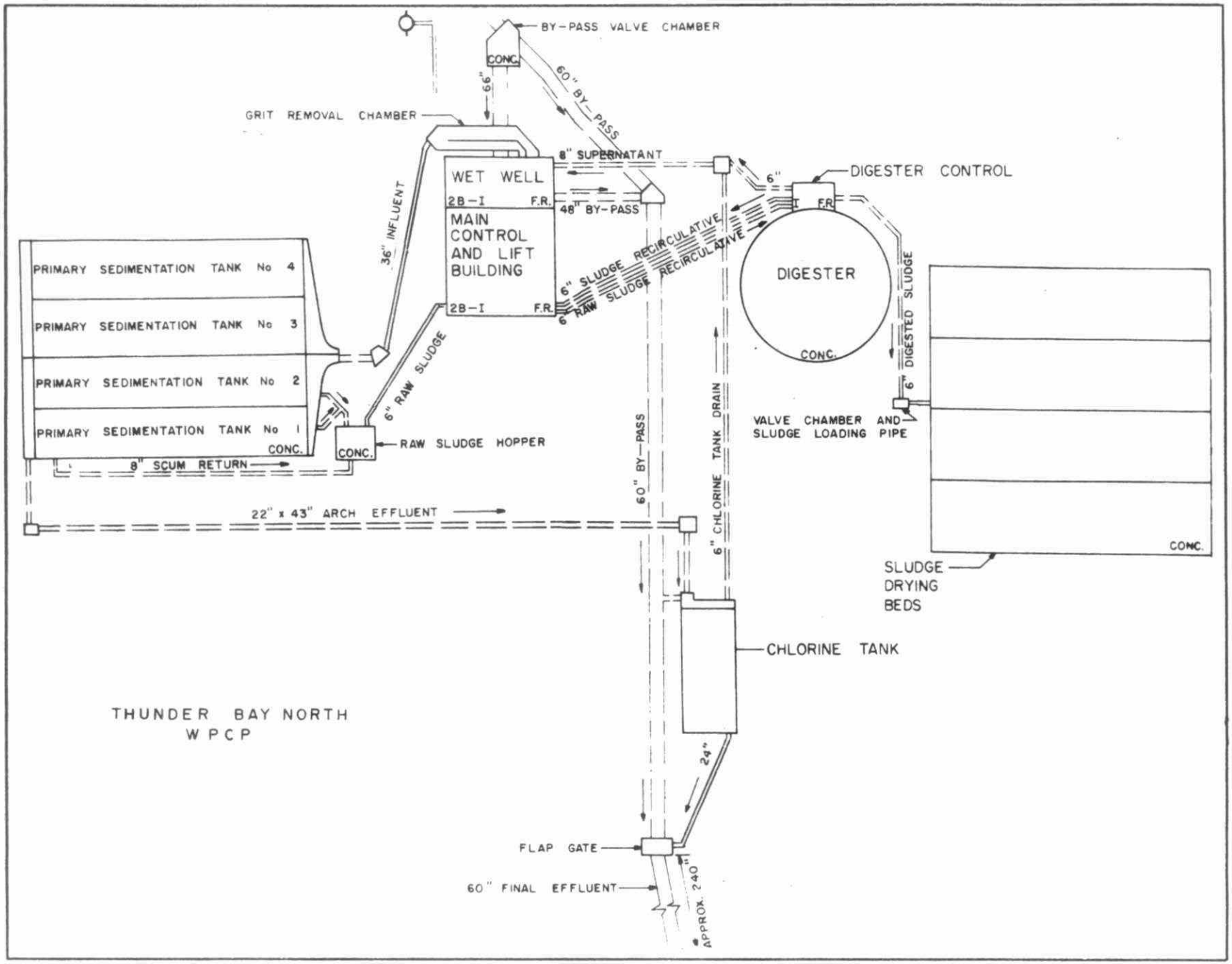
RETURN SLUDGE PUMPS:
Three WORTHINGTON
Capacity (each): 6100 gpm at 51' TDH
One WORTHINGTON
Capacity : 840 gpm at 32' TDH

AEROBIC DIGESTER
One, 132.5' x 48' x 15' swd (two-pass)
Volume (total) 595, 000 I. Gal.

CHLORINATORS:
One, FISHER AND PORTER
Type: 70-4500
Capacity: 8000 lb/day
One, FISHER AND PORTER
Type: 71-V1006
Capacity: 400 lb/day

CHLORINE CONTACT CHAMBER:
139' x 30' x 12.5'
Volume: 325, 000 I. Gal.

LAGOONS
One, Area: 1 acre


BY-PASS VALVE CHAMBER
CONC.
66"
60" BY-PASS
GRIT REMOVAL CHAMBER
8" SUPERNATANT
WET WELL
2B-I F.R.
MAIN CONTROL AND LIFT BUILDING
2B-I F.R.
48" BY-PASS
36" INFLUENT
6" SLUDGE RECIRCULATIVE
6" RAW SLUDGE RECIRCULATIVE
6" DIGESTER CONTROL
F.R.
DIGESTER
CONC.
6" DIGESTED SLUDGE
PRIMARY SEDIMENTATION TANK No 4
PRIMARY SEDIMENTATION TANK No 3
PRIMARY SEDIMENTATION TANK No 2
PRIMARY SEDIMENTATION TANK No 1
CONC.
6" RAW SLUDGE
CONC.
RAW SLUDGE HOPPER
8" SCUM RETURN
VALVE CHAMBER AND SLUDGE LOADING PIPE
60" BY-PASS
6" CHLORINE TANK DRAIN
22" x 43" ARCH EFFLUENT
CONC.
SLUDGE DRYING BEDS
CHLORINE TANK
THUNDER BAY NORTH
W P C P
24"
FLAP GATE
60" FINAL EFFLUENT
APPROX. 240'

DESIGN DATA

PROJECT NO.	2-0013-58
TREATMENT	Primary
DESIGN FLOW	4.0 mgd
DESIGN POPULATION	40,000

PRIMARY TREATMENT

Grit Removal

Type: Channels; mechanically cleaned (Rex San.)
Size: Two 35' x 3' x 5' deep (6,540 gal)
Retention: 4.7 min (two channels)
Flow Velocity: 0.248 fps

Comminution

Type: Barminutor
Size: One Model B (35")
One Model A1 (48")

Sewage Lift Pumps

a) Type: Chicago Pumps (ele)
Size: Two 4150 gpm @ 50' tdh

b) Type: Fairbanks-Morse (diesel)
Size: One 29,000 gpm @ 33' tdh

Primary Sedimentation

Type: Jeffrey
Size: Four 100' x 18' x 8' deep (356,000 gal)
Retention: 2.14 hr
Loading: Surface, 560 gal/ft^2/day
Weir, 6,000 gal/ft/day

CHLORINATION

Type: W & T
Size: One 500 lb/day

Chlorine Contact Chamber

Size" 45' x 20' x 10'
Retention: 20 min

OUTFALL

- 240' of 60" dia corrugated pipe to McIntyre River

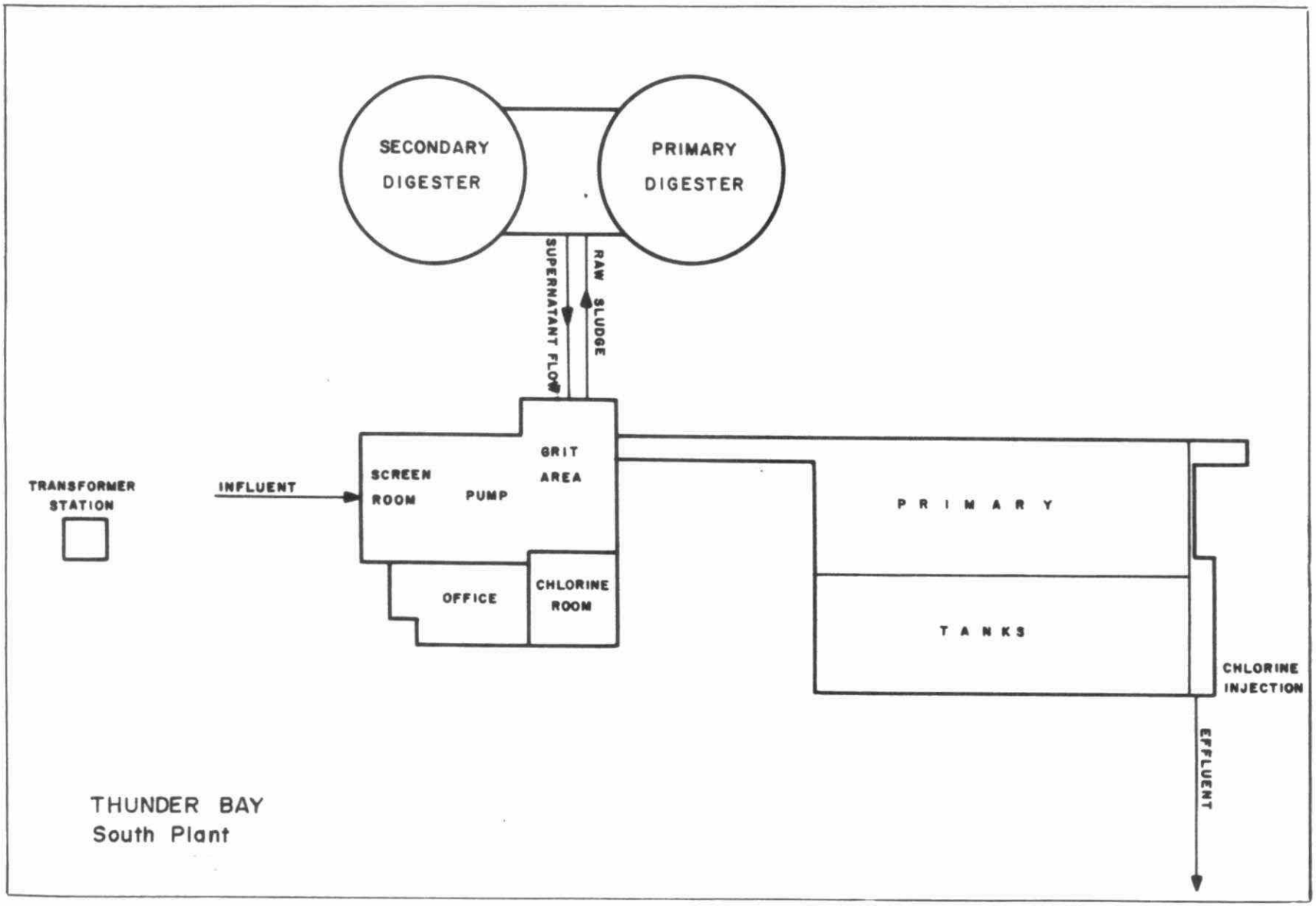
SLUDGE HANDLING

Digestion System - Single-stage

Type: Mixed by recirculation; floating cover
Size: One 50' dia x 20' swd (50,000 cu ft or 0.312 mil gal)
Loading: 2.0 lb/cu ft/mo

Drying Beds

Size: Four 100' x 25' (10,000 sq ft)


SECONDARY DIGESTER
PRIMARY DIGESTER
SUPERNATANT FLOW
RAW SLUDGE
TRANSFORMER STATION
INFLUENT
SCREEN ROOM
PUMP
GRIT AREA
OFFICE
CHLORINE ROOM
PRIMARY
TANKS
CHLORINE INJECTION
EFFLUENT
THUNDER BAY
South Plant

DESIGN DATA

PROJECT NO.	2-0091-61
TREATMENT	Primary
DESIGN FLOW	6.0 mgd
DESIGN POPULATION	48,000

PRIMARY TREATMENT

Screening

- Trash Racks
  Type: Jeffrey
  Size: Two with 3" spacing

- Grinder
  Type: Jeffrey (One)

- Coarse bar screens
  Type: David Brown
  Size: Two with 1" spacing

Sewage Lift Pumps

Type: Fairbanks-Morse
Size: Two 5140 gpm @ 36½' tdh
Two 3490 gpm @ 36½' tdh
(variable speed, electric)

Grit Removal

Type: Aerated; grit removed by clamshell bucket
Size: One 29' x 25' x 15' deep
Retention: 1.5 min

Primary Sedimentation

Type: Jeffrey
Size: Two 132' x 37' x 10' avg (622,000 gal)
Retention: 2.5 hours
Loading: Surface, 600 gal/ft^2/day
Weir, 10,000 gal/ft/day

CHLORINATION

W & T

Chlorine Contact Chamber

- in effluent chamber

OUTFALL

- to Kam River

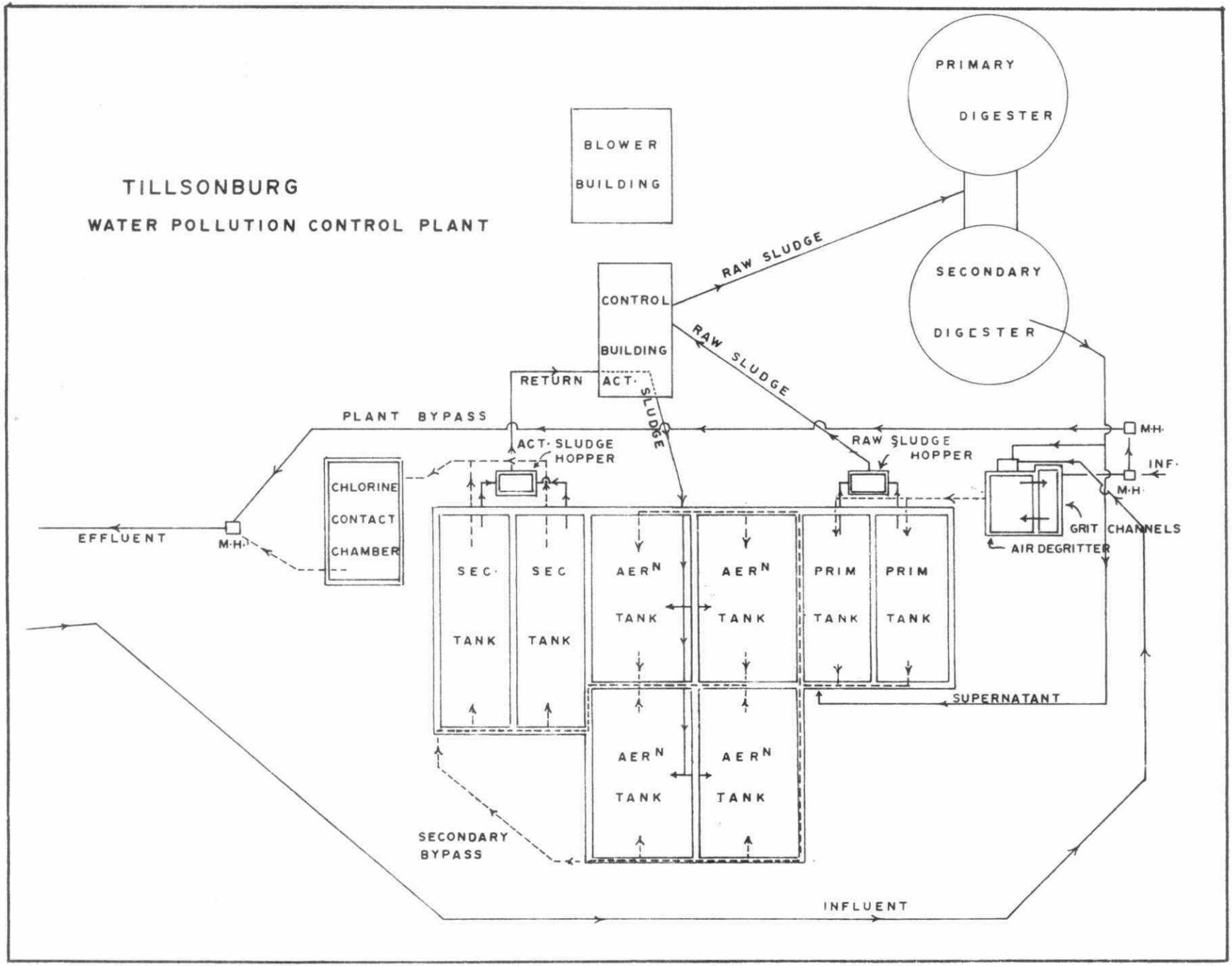
SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
Type - Gas mixed PFT
Size - One 60' dia (71,000 cu ft or 442,000 gal)
Loading - 3.0 lb/ft^3/mo

Secondary --
Size - One 60' dia (71,000 cu ft or 442,000 gal)
Total Loading - 1.5 lb/ft^3/mo


TILLSONBURG
WATER POLLUTION CONTROL PLANT
BLOWER BUILDING
PRIMARY DIGESTER
SECONDARY DIGESTER
CONTROL BUILDING
RAW SLUDGE
RAW SLUDGE
RETURN ACT. SLUDGE
PLANT BYPASS
ACT. SLUDGE HOPPER
RAW SLUDGE HOPPER
M.H.
INF.
M.H.
CHLORINE CONTACT CHAMBER
EFFLUENT
M.H.
SEC. TANK
SEC TANK
AERN TANK
AERN TANK
PRIM TANK
PRIM TANK
GRIT CHANNELS
AIR DEGRITTER
SUPERNATANT
AERN TANK
AERN TANK
SECONDARY BYPASS
INFLUENT

DESIGN DATA

Project No: 1-0137-67
Design Flow: 1.8 MGD
BOD: Raw Sewage - 235 mg/l
Removal 95%
SS: Raw Sewage - 250 mg/l
Removal 95%

PRIMARY TREATMENT

AIR DEGRITTER:
Size, 13' x 15' x 10' swd
Volume: 12,160 I. Gal. Detention: 9.7 min.

PRIMARY SEDIMENTATION:
Two, Size 50.3' x 10' x 8' swd
One, Size 50' x 20' x 8.25' swd
Volume: (total) 102,000 I. Gal.
Detention: 1.3 hours
Overflow Rate: 900 gal/ft^2/day

SECONDARY TREATMENT

AERATION TANKS:
Type: Diffused Air
Size: Four, size 50' x 30' x 13' swd
Volume (total): 487,000 I. Gal.
Detention: (total) 6.5 hours

SECONDARY SEDIMENTATION:
Size: Two, size 50.3' x 10' x 12.25' swd
One, size 65' x 20' x 12.5' swd
Volume (total): 178,000 I. Gal.
Detention (total) 2.4 hr.
Overflow Rate: 780 gal/ft^2/day

CHLORINATION:
Chlorinator: Type: W & T A731
Size: 400 lb/day

CHLORINE CONTACT CHAMBER:
Size: 21' x 20' x 9.2' swd
Volume: 24,000 I. Gal. Detention: 19 min.

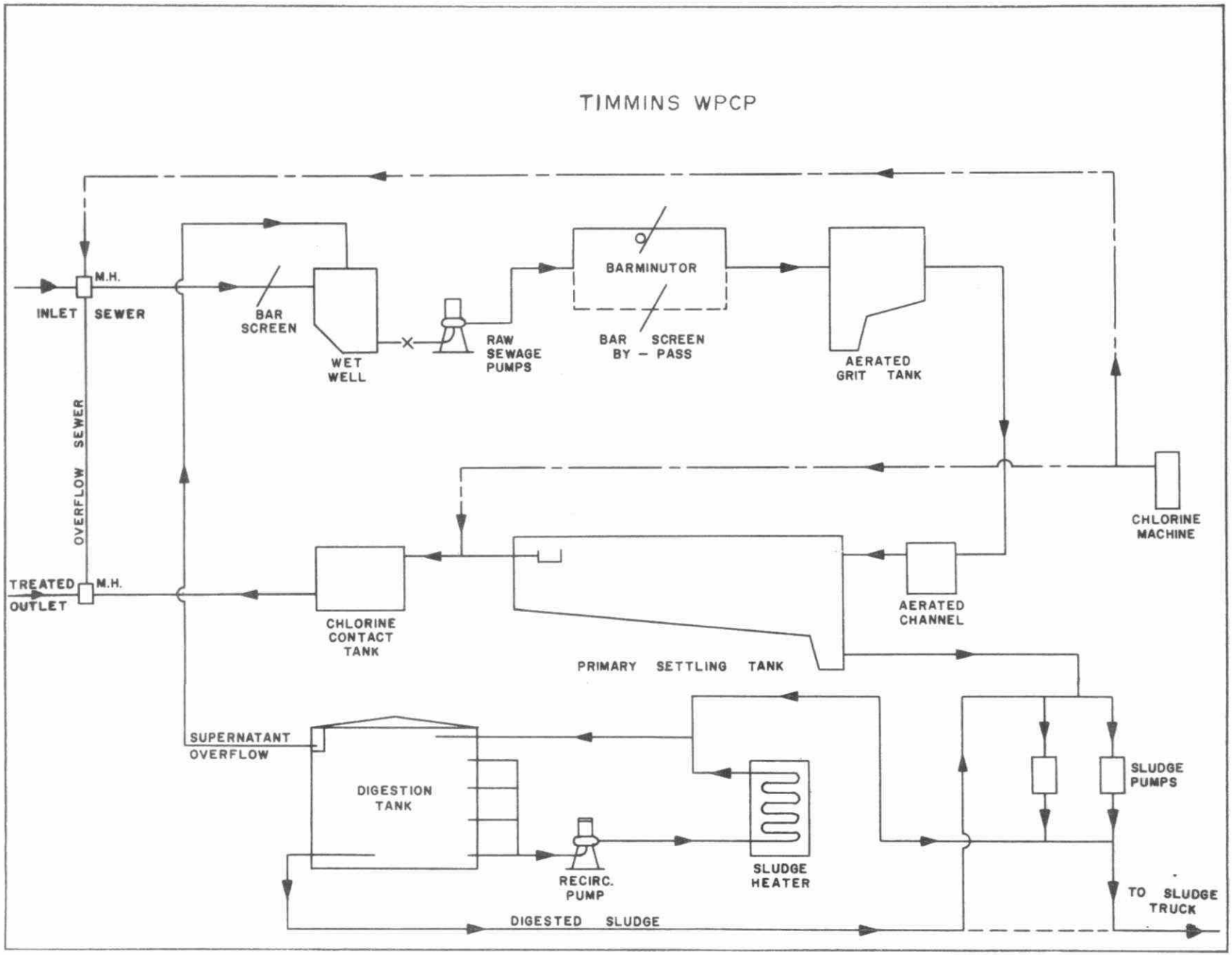
OUTFALL - to creek

SLUDGE HANDLING:
Digestion System : Two-Stage
Primary Digester: 45' dia. x 20' swd.
Volume: 36,000 ft^3
Secondary Digester: 45' dia. x 20' swd
Volume: 36,000 ft^3

PUMPING STATION:
John Pound Street Pumping Station

Capacity: 2.7 MGD plus 50% standby

Screening and Comminution.


TIMMINS WPCP
M.H.
INLET SEWER
BAR SCREEN
WET WELL
RAW SEWAGE PUMPS
BARMINUTOR
BAR SCREEN BY - PASS
AERATED GRIT TANK
CHLORINE MACHINE
OVERFLOW SEWER
TREATED OUTLET
M.H.
CHLORINE CONTACT TANK
AERATED CHANNEL
PRIMARY SETTLING TANK
SUPERNATANT OVERFLOW
DIGESTION TANK
RECIRC. PUMP
SLUDGE HEATER
SLUDGE PUMPS
TO SLUDGE TRUCK
DIGESTED SLUDGE

DESIGN DATA

PROJECT NO.	2-0071-60
TREATMENT	Primary
DESIGN FLOW	3.0 mgd
DESIGN POPULATION	30,000
BOD - Raw Sewage	180 mg/l
- Removal	35-40%
SS - Raw Sewage	200 mg/l
- Removal	60-65%

RAW SEWAGE PUMPS

Screening

Type: Manually Cleaned
Size: 2" opening

Pumps

Type: Worthington
Size: One 3650 gpm @ 26' tdh
One 3120 gpm @ 26' tdh
One 3120 gpm @ 26' tdh (diesel)

PRIMARY TREATMENT

Comminution

Type: Chicago Pump Barminutor
Size: One Model C (36")

Grit Removal

Type: Aerated
Size: One 13' x 18 3/4' x 12½'
(19,000 gal)
Retention: 9.1 min
Air Supply: Two Sutorbilt

Primary Sedimentation

Type: Jeffrey
Size: Two 125' x 20' x 12' (avg)
(374,000 gal)
Retention: 3.0 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 9900 gal/ft/day

CHLORINATION

Type: F & P
Size: One 200 lb/day

Chlorine Contact Chamber

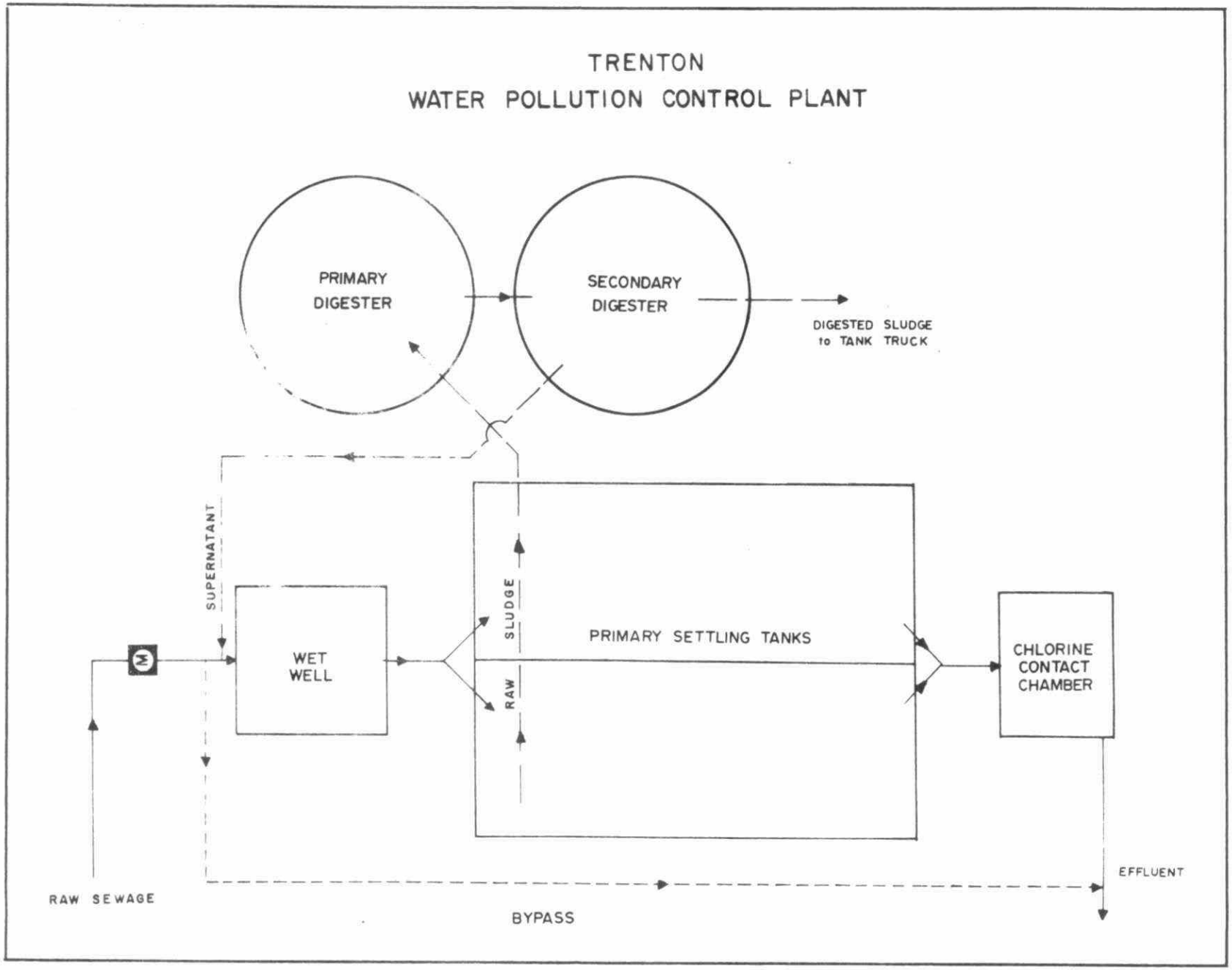
Size: Two 47½' x 7' x 9'7"
(37,400 gal)
Retention: 19 min

OUTFALL

To Mattagami River

SLUDGE HANDLING

Digestion System - single-stage, concrete
Type: PFT (gas mixed)
Size: One 65' dia x 24' swd (80,000 cu ft or 0.50 mil gal)
Loading: 1.35 lb/cu ft/mo


TRENTON
WATER POLLUTION CONTROL PLANT
PRIMARY DIGESTER
SECONDARY DIGESTER
DIGESTED SLUDGE to TANK TRUCK
SUPERNATANT
SLUDGE
RAW
PRIMARY SETTLING TANKS
WET WELL
M
CHLORINE CONTACT CHAMBER
EFFLUENT
RAW SEWAGE
BYPASS

DESIGN DATA

PROJECT NO.	2-0004-57
TREATMENT	Primary
DESIGN FLOW	1.0 mgd
DESIGN POPULATION	12,000
BOD - Raw Sewage	250 mg/l
- Removal	35%
SS - Raw Sewage	200 mg/l
- Removal	55%

PRIMARY TREATMENT

Grit Removal

Type: Aerated, with air lift
Size: One 10' x 9' x 8½' (4,775 gal)
Retention: 1.5 min

Primary Sedimentation

Type: Jeffrey
Size: Two 52' x 16' x 12' (125,000 gal)
Retention: 3.0 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 8340 gal/ft/day

Air Supply

Two Roots-Connersville

CHLORINATION

Type: F & P

Chlorine Contact Chamber

- not provided; chlorination in outfall

OUTFALL

- 850 ft of 30" concrete pipe to Bay of Quinte

SLUDGE HANDLING

Digestion System - Two-stage

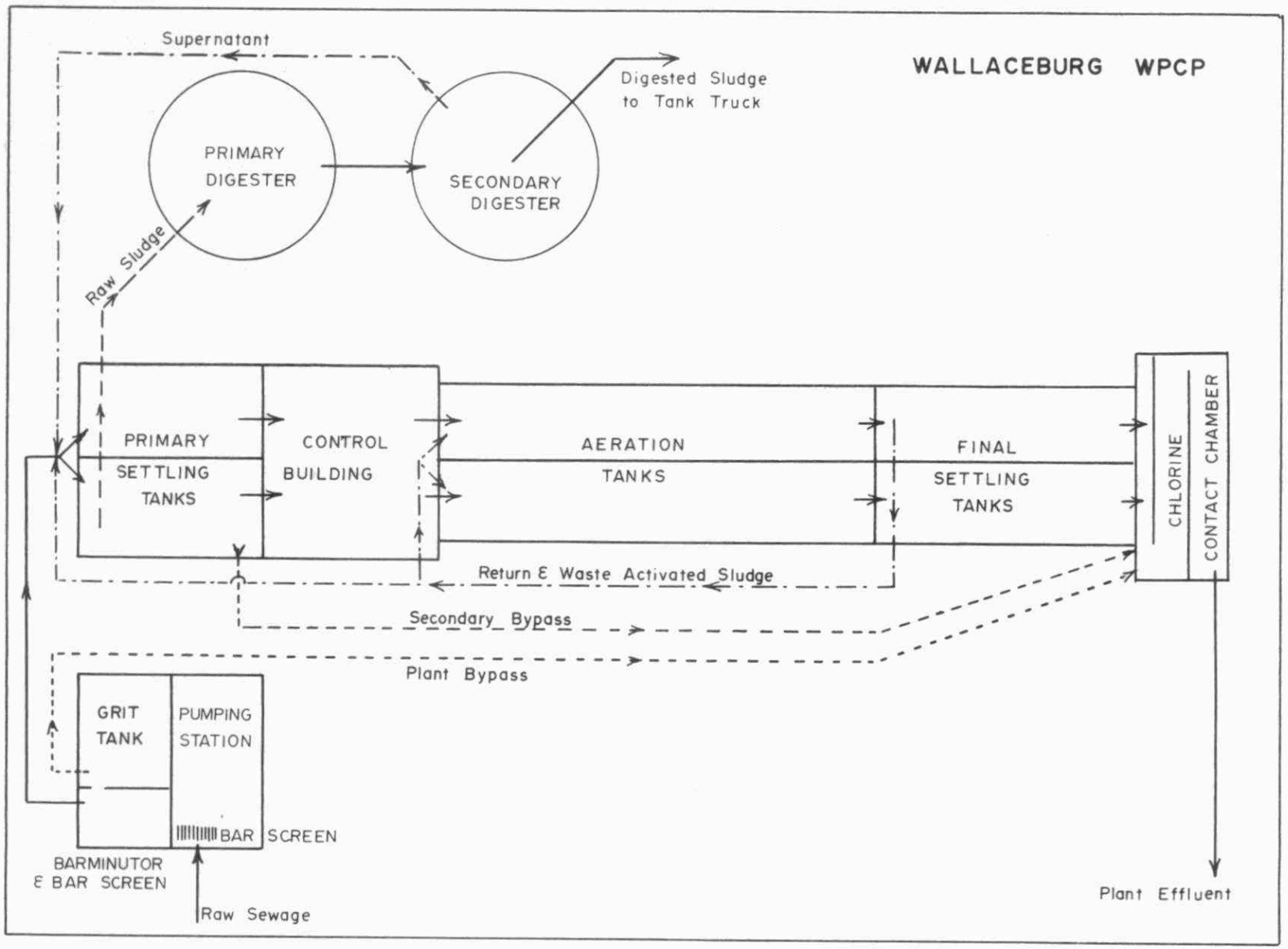
Primary --
Type: Gas mixed, fixed cover; PFT
Size: One 28' dia x 23' (13,500 cu ft or 84,000 gal)
Loading: 2.62 lb/cu ft/mo

Secondary --
Type: Fixed cover
Size: One 28' dia x 23' (13,500 cu ft or 84,000 gal)
Total Loading: 1.31 lb/cu ft/mo

PUMPING STATIONS

Dundas Street Pumping Station

Type: Fairbanks-Morse
Size: One 700 gpm @ 39' tdh
One 1740 gpm @ 48' tdh
One 3130 gpm @ 68' tdh (diesel)


WALLACEBURG WPCP
Supernatant
Digested Sludge to Tank Truck
PRIMARY DIGESTER
SECONDARY DIGESTER
Raw Sludge
PRIMARY SETTLING TANKS
CONTROL BUILDING
AERATION TANKS
FINAL SETTLING TANKS
CHLORINE CONTACT CHAMBER
Return & Waste Activated Sludge
Secondary Bypass
Plant Bypass
GRIT TANK
PUMPING STATION
BAR SCREEN
BARMINUTOR & BAR SCREEN
Raw Sewage
Plant Effluent

DESIGN DATA

PROJECT NO.	1-0087-67
DESIGN POPULATION	13,500
DESIGN LOADING	1.5 IMGD
DESIGN BOD LOADING	3,000 lb/day
DESIGN SS LOADING	3750 lb/day

COMMINUTION

No. of units - 1
Type: Barminutor

GRIT REMOVAL

No. of tanks - 1
Type: Aerated by diffusers

PRIMARY SEDIMENTATION

No. of tanks - 2
Tank dimensions: 16'x48'x14.5' each
Detention: 2.22 hours

AERATION

No. of tanks - 2
Type: aerated by diffusers
Tank dimensions: 16'x106'x13.25' each
Detention: 4.49 hours

SECONDARY SEDIMENTATION

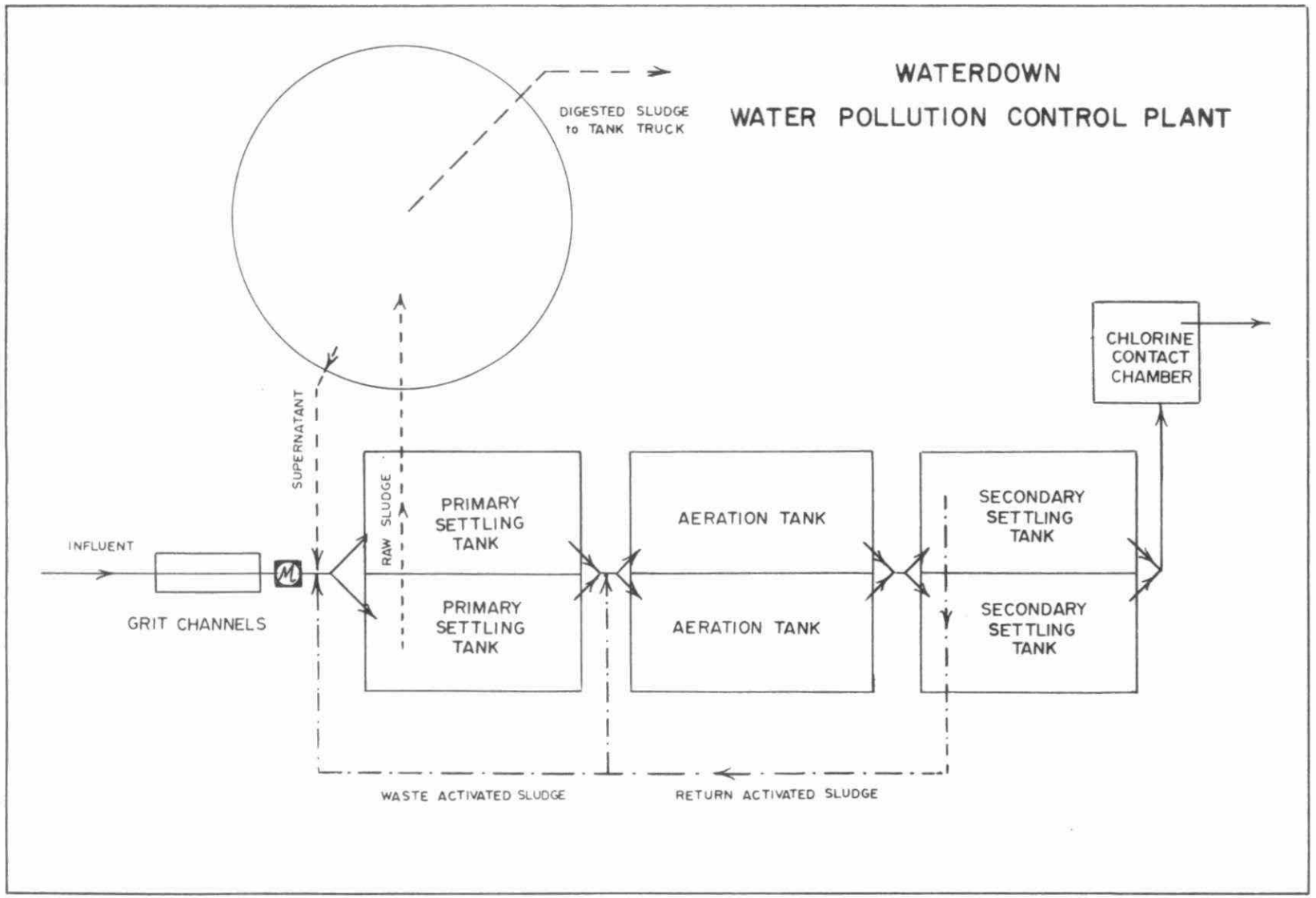
No. of tanks - 2
Tank dimensions: 72'x16'x12.5' each
Detention: 2.68 hours

CHLORINATION

No. of tanks - 1
Detention: 21.8 min.

SLUDGE DIGESTION

No. of tanks - 2
Tank dimensions: one @ 35' dia x 19'
one @ 35' x 18.5'
Total Detention: 21.1 days


WATERDOWN
WATER POLLUTION CONTROL PLANT
DIGESTED SLUDGE
to TANK TRUCK
CHLORINE
CONTACT
CHAMBER
SUPERNATANT
RAW SLUDGE
PRIMARY
SETTLING
TANK
PRIMARY
SETTLING
TANK
AERATION TANK
AERATION TANK
SECONDARY
SETTLING
TANK
SECONDARY
SETTLING
TANK
INFLUENT
GRIT CHANNELS
M
WASTE ACTIVATED SLUDGE
RETURN ACTIVATED SLUDGE

DESIGN DATA

PROJECT NO.	2-0163-63
TREATMENT	Activated Sludge
DESIGN FLOW	0.30 mgd

PRIMARY TREATMENT

Screening

Type: Manually cleaned
Size: One 2" spacing

Grit Removal

Type: Channel, manually cleaned

Primary Sedimentation

Type: Walker Process CRP
Size: Two 30' x 8' x 8' (24,000 gal)
Retention: 1.9 hours
Loadings: Surface 625 gal/ft^2/day
Weir 6,520 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single-pass
Size: Two 50' x 14' x 11' (15,400 ft^3 or 96,000 gal)
Retention: 7.7 hours

Air Supply

Type: Aerzener Blowers
Size: Two 600 cfm

Diffusers

Type: Chicago Pump Discïusers
Spacing: 48 (total) @ 2' centres

Secondary Sedimentation

Type: Walker Process CR
Size: Two 30' x 8' x 11' (33,000 gal)
Retention: 2.6 hours
Loading: Surface 625 gal/ft^2/day
Weir 6,520 gal/ft/day

CHLORINATION

- One F & P 2-40 lb/day

Chlorine Contact Chamber

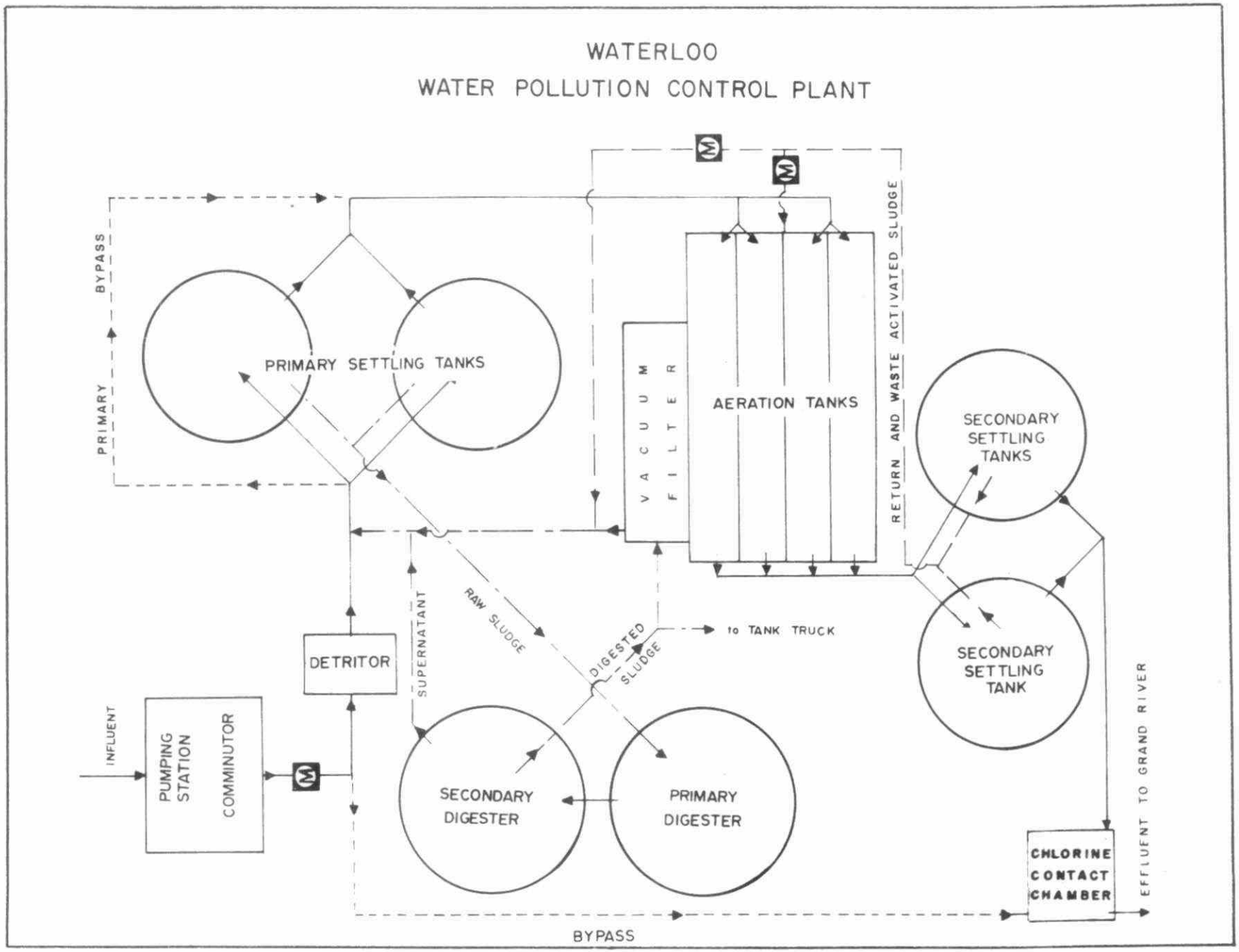
Size: 6' x 17' x 8'-9" (5,600 gal)
Retention: 27 minutes

OUTFALL

- to Grindstone Creek

SLUDGE HANDLING

Digestion System - single stage
Type: Fixed steel cover, mixed by recirculation
Size: One 30' dia x 17' swd (15,100 ft^3 or 94,000 gal)


WATERLOO
WATER POLLUTION CONTROL PLANT
BYPASS
PRIMARY
PRIMARY SETTLING TANKS
VACUUM FILTER
AERATION TANKS
RETURN AND WASTE ACTIVATED SLUDGE
SECONDARY SETTLING TANKS
SECONDARY SETTLING TANK
SUPERNATANT
RAW SLUDGE
DIGESTED SLUDGE
to TANK TRUCK
DETRITOR
INFLUENT
PUMPING STATION
COMMINUTOR
SECONDARY DIGESTER
PRIMARY DIGESTER
CHLORINE CONTACT CHAMBER
EFFLUENT TO GRAND RIVER
BYPASS

DESIGN DATA

PROJECT NOS.	2-0022-58 2-0203-66
DESIGN FLOW	6.0 mgd*
DESIGN POPULATION	30,000
BOD - Raw Sewage	300 mg/l
- Removal	90%
SS - Raw Sewage	270 mg/l
- Removal	90%

PRIMARY TREATMENT

Comminution

One Worthington

Sewage Lift Station

Type: Canada Pump
Size: Two 2900 gpm @ 32' tdh (el)
One 5000 gpm @ 32' tdh (diesel)

Grit Removal

Type: Dorr Detritor
Size: Two 14' x 14' x 1.6' (3,900 gal)
Retention: 0.94 min

Primary Sedimentation

Type: Dorr
Size: Two 75' dia x 13' swd
Ret (0.772 mil gal)
Loading: Surface, 680 gal/ft
Weir, 12,700 gal/f
Retention: 3.09 hours
Loading: Surface, 680 gal/ft^2/day
Weir, 12,700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single-pass with turbine aerators
Size: Four 134' x 32½' x 15½' (1.68 m
Ret (1.68 mil gal)
Retention: 6.7 hours

Diffusers

(a) Spargers (66/tank)
(b) "Lightnin" Turbine (3/tank)

Air Supply

Type: Sutorbilt
Size: Two 3,750 cfm

Secondary Sedimentation

Type: Dorr
Size: Two 65' dia x 10' swd
(0.458 mil gal)
Retention: 1.8 hours
Loading: Surface, 905 gal/ft^2/day
Weir, 14,650 gal/ft/day

CHLORINATION

Type: BIF
Size: One 400 lb/day

OUTFALL

- to Grand River

SLUDGE HANDLING

Digestion System - Two-stage

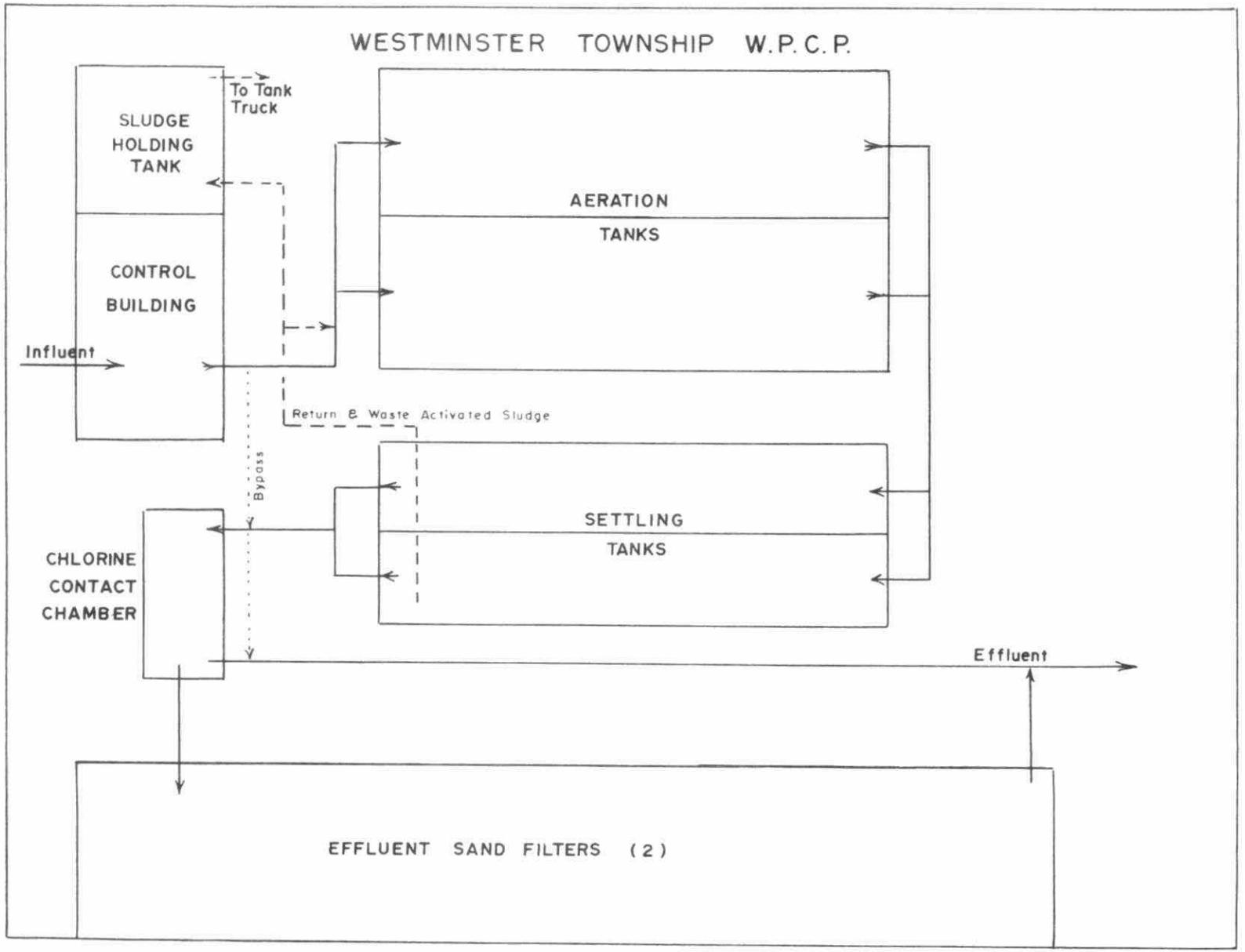
Primary - fixed cover
Type: Dorr draft tubes (3)
Size: One 80' x 21½' swd
(124,500 cu ft or 0.776 mil gal)
Loading: 3.5 lb/cu ft/mo

Secondary -
Size: One 80' dia x 20' swd
(117,000 cu ft or 0.73 mil gal)
Total Loading: 1.8 lb/cu ft/mo

Vacuum Filter

Type: Komline-Sanderson
Size: One 300 sq ft

* Secondary clarifier 4.0 mgd design rate


WESTMINSTER TOWNSHIP W.P.C.P.
SLUDGE HOLDING TANK
To Tank Truck
CONTROL BUILDING
Influent
AERATION TANKS
Return & Waste Activated Sludge
Bypass
SETTLING TANKS
CHLORINE CONTACT CHAMBER
Effluent
EFFLUENT SAND FILTERS (2)

DESIGN DATA

PROJECT NO.	2-0033-59
TREATMENT	Extended Aeration
DESIGN FLOW	0.25 mgd
DESIGN POPULATION	5,000

PRETREATMENT

Comminution

Type: Barminutor
Size: One Model B (12")
Chicago Pump Co.

RAW SEWAGE PUMPS

Make: Chicago Pump
#1 - 100 gpm @ 23' tdh
Type: 4x4, 2hp electric
#2 - 100 gpm @ 23' tdh
Type: 4x4, 2hp electric
with standby Wisconsin
THD size $3\frac{1}{4}$ x $3\frac{1}{4}$ gasoline engine
#3 - 250 gpm x 20' tdh
Type: LMC4, 3 hp electric

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 54' x 27' x 14' (252,000 gal)
Retention: 24.2 hr

Diffusers

- Discfusers on swing arm

Air Supply

Type: Sutorbilt
Size: Three 337 scfm @ 7 psi

Secondary Sedimentation

Type: Link-Belt
Size: Two 54' x 8' x 9.25' (50,200 gal)
Retention: 4.80 hr
Loading: Surface, 580 gal/ft^2/day
Weir, 1955 gal/ft/day

CHLORINATION

Type: W & T
Size: One 100 lb/day

Chlorine Contact Chamber

Size: One 10' x 7' x 9' (3930 gal)
Retention: 22.7 min

OUTFALL

- to Dingman Creek

TERTIARY TREATMENT

Effluent Sand Filters

Size: Four units (26,900 sq ft or 0.62 acres)
Depth: 30" of sand (min)
Capacity: .405 mil gal/acre/day

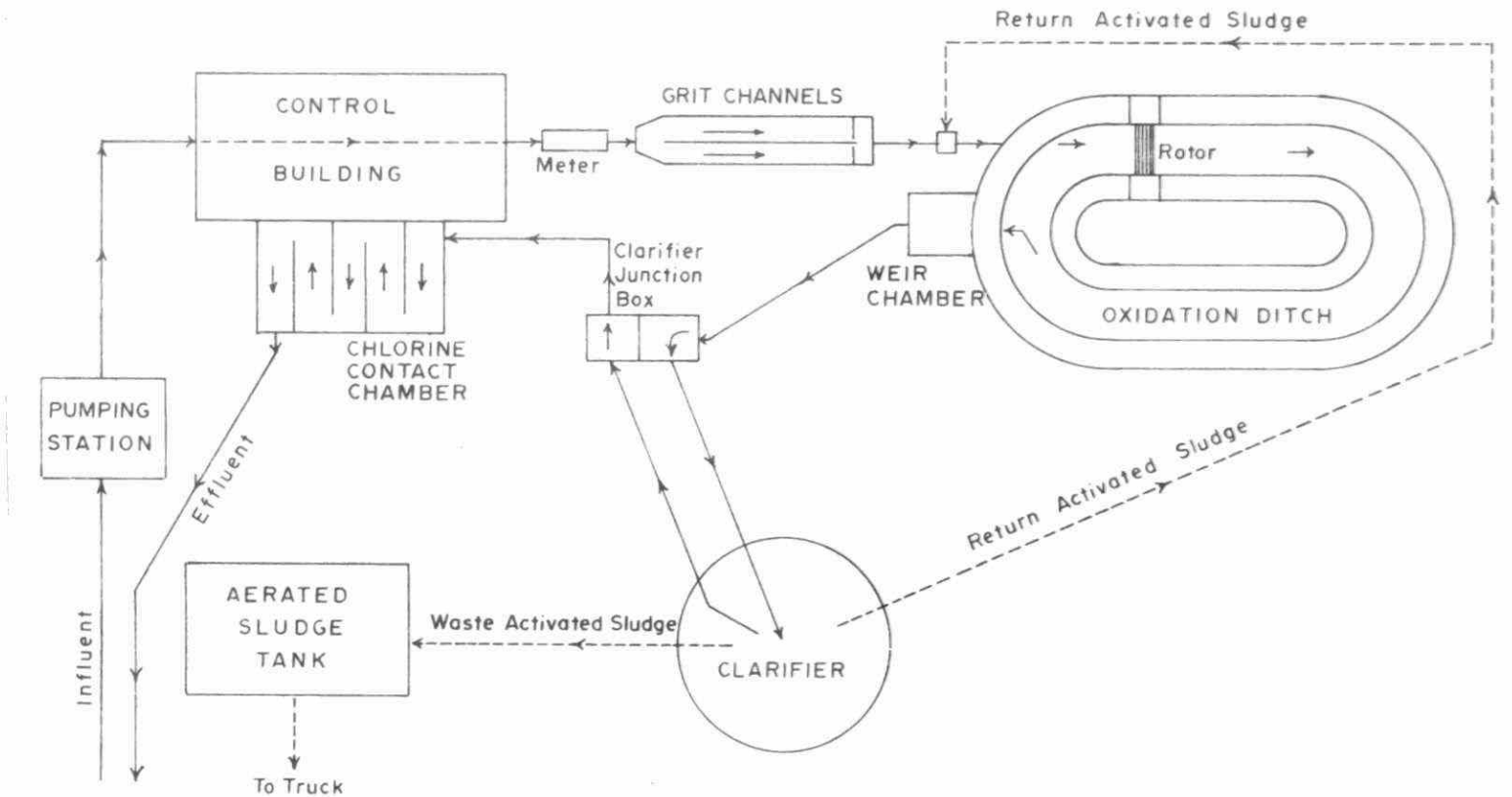
SLUDGE HANDLING

Sludge Holding Tank

Size: 4,460 cu ft or 27,850 gal

TOWNSHIP OF WOOLWICH

WATER POLLUTION CONTROL PLANT



DESIGN DATA

Project No:	1-0063-67
Treatment:	Extended Aeration
Design Flow:	0.21 MGD

RAW SEWAGE PUMPING:
Two, Type: FLYGT CP-3150
Size: 600 USGPM at 24' TDH

GRIT CHANNELS:
Two, 19' x 1.6' x 2.2'
Volume (each) 420 I. Gal.
Detention: (each) 2.8 min.

OXIDATION DITCH:
Volume: 200,000 I. Gal.
WL Dept. 5' Detention: 22.8 hours

Rotor - Type: Pumps and Softners
Size: 15' length

CLARIFIER:
24' dia. x 9.5' swd
Volume: 27,000 I. Gal.
Detention: 3.1 hours
Mechanism: DORR OLIVER LONG
Overflow Rate: 465 gpd/sq. ft.

CHLORINE CONTACT CHAMBER:
5 passes, each 12.3' x 2.5' x 5' awl
Volume: 4,800 I. Gal.
Detention: 33 min.

TD
419
W38
1974