

PORT JEFFERSON 201 FACILITY PLAN

C-36-709

REVISED COST TABLES FOR CHAPTER 8
AND EXHIBIT 8D
APRIL 1984

EXHIBIT 8DR

SUFFOLK COUNTY, NEW YORK
DEPARTMENT OF PUBLIC WORKS

Revised Tables

1. General Revisions

a. Design

Design criteria utilized in Chapter 8 was established prior to 1980. Due to work on the selected plan, i.e. basis of design, preliminary design and Value Engineering session as well as the progress of over four years, it was necessary to verify criteria prior to amending the Facility Plan.

Tables requiring revisions included those discussing flows and treatment levels, unit sizing criteria and items contained within the various cost comparison tables.

b. Costs

Chapter 7 of the Facility plan provided the basis of cost estimates used in the evaluation of waste treatment alternatives in Chapter 8. Due to revised construction dates, Exhibit 8D revised all costs to June 1983. Circumstances regarding the implementability of the Final Facility Plan's selected plan requires further revisions in the comparison of alternatives, in the alternatives under evaluation and in the anticipated bid date. The basic cost revisions included:

Construction Costs - the Engineering News Record index was projected from March 1984 through January 1986. This new index was the basis for the construction cost increases from the previously prepared tables of June 1983.

Engineering Costs - engineering costs along with the legal and administrative costs remained at 20% from the original facility plan and would be further revised in Chapter 9.

O&M Costs - labor costs were increased from \$15 to \$19 per hour resulting in the inclusion of the realistic manhours per year utilized in Suffolk County operations. The increased costs per hour assumes an average amount of overtime, holidays and administrative costs associated with the program. Material and supplies were increased by utilizing the Engineering News Record index discussed above. Due to the uncertainty in future power costs, the 12¢/kw which exists today was used in the analysis. This is in line with the cost effective guidelines indicating that prevailing prices at the time of the analysis can be used.

Aid - the allowance for Engineering Services based on building costs and Section 35.2025 of 40CFR were utilized. 77-1/2% of non engineering costs were assumed for the remainder of the aid. Alternative 1A was the referenced alternative to

establish construction grant funds.

Distribution - all costs were distributed based on percent of flow for shared facilities and/or use for facilities used solely by specific district.

Interest during construction, established by the Water Resource Council is 8-1/8%. Salvage values were calculated considering this interest and service life of system components. A compound recovery factor of 0.1028 was used to calculate Equivalent Annual Capital Costs, based on a 20 year planning period at an interest of 8-1/8%.

c. Alternatives

The alternatives to be evaluated in revised Chapter 8 include the following:

- 2L - abandon S. D. No. 10 and pump sewage to SUNY; advanced treatment at SUNY including S. D. NO. 10 with pumping to Port Jefferson Harbor; future evaluation to consider recharge; S. D. No. 1 treats its waste alone at secondary treatment plant.
- 2C - identical to 2L with the exception that the campus plant will be only secondary treatment without the possibility of future recharge.
- 2C-2 - abandon S. D. No. 10 and pump to SUNY; provide primary treatment at SUNY including S. D. No. 10 and pump to S. D. No. 1; S. D. No. 1 provides primary treatment for its waste alone and secondary treatment for all sewage including S. D. NO. 10 and SUNY.
- 1A - identical to 2C-2 with the deletion of the primary plant on campus and all treatment being performed at the S. D. No. 1 sites.

Plan 2C-2, as proposed, is to include an outfall to the Harbor mouth. Due to identical effluent loadings, the outfall must be considered for alternatives 2C and 1A as well. Costs are included in the tables as noted.

2. Specific Revisions

a. Design

1. Table 8.2-1 - The alternative under assessment as well as the plant flows have been revised. The plant flows at S.D. No. 1 and S. D. No. 10 are considered saturated flows with S. D. No. 1 flow being available once rehabilitation is complete and after developments are completed within and around the Village of Port Jefferson. Due to the varying rates of SUNY flow above the baseline the 2.0 MGD flow remains.

2. Table 8.2-3 - Although the unit sizing criteria has not required revision, the average design flows for the alternative under reassessment include 0.7 MGD, 2.5 MGD and 3.2 MGD. The criteria for 0.6, 2.6 and 3.05 MGD apply for these new flows.

3. Table 8.2-15 - Revisions necessary due to Exhibit 3D of October 1981 and revised cost estimate. S4 is most cost effective, however, the technical ranking is revised.

4. Outfall - Alternatives 1A, 2C and 2C-2 result in similar loadings to Port Jefferson Harbor. Since 2C-2 was prepared with an outfall to the mouth of the Harbor, the other alternative must also consider such construction. The effluent limits dictating the need for an outfall have not been required by New York State and, therefore, outfall costs are ineligible. Chapter 9 will require verification of \$3,600,000 by evaluating routes, discharge locations and construction techniques.

b. Costs

1. Table 8.2-4 - \$5,000 was added to the pretreatment system for alternatives listed in the table. \$5,000 was also added to the aeration equipment due to the increased electrical requirements necessary when revising the flows upward from the original design capacity. Alternative 2C-2 includes preliminary treatment for 0.7 MGD while the remainder of the costs relate to 3.2 MGD. O&M costs were adjusted on 2C-2 in the power and labor categories.

2. Table 8.2-5 - Costs were revised for Alternative 2L without recharge facilities. If the plant effluent is unacceptable or the cost for recharge is prohibitive due to the University constraints, the effluent from SUNY may not be recharged. In addition, because this alternative is not the most cost effective and project costs are not fully eligible for grants variation in funding and cost distribution are possible. To avoid unnecessary construction these costs are not considered at this time but do recognize that additional costs could make the alternative less cost effective.

This table has been revised from the initial 2 MGD to 2.5 MGD using a flow ratio for some items. These items include pretreatment, primary, aeration tank, structural, RBC, trickling filter and disinfection. The aeration equipment and building were increased by only 15% due to the building remaining the same size. Final clarifiers were increased by 5% due to the equalized flow from S.D. No. 10 creating minor impacts on the clarifiers. Recycle pumping, electrical work and site work were not increased.

Alternative 2C-2 was adjusted from the 2.6 MGD primary system included in Table 8.2-4. Lower engineering costs resulted since Table 8.2-4 did not reflect reductions in engineering due to the primary plant at the campus. It is expected that plans and speci-

specifications would only result in minor changes with the site layout and piping.

Power was assumed to increase by 17% based on the horsepower requirements of the various biological systems and the percentage of that horsepower increased due to higher flows and loadings. Chemicals were adjusted upward by 12% by taking a percentage of materials and supplies associated with chemicals.

3. Table 8.2-10 - Havens & Emerson has indicated that as a result of their primary design on Alternative 3B their policy will be to recommend a minimum 30' diameter thickener. In accordance with this recommendation each facility will be required to install a 30' diameter thickener with Table 8.2-10 being adjusted accordingly. Construction costs were based on Havens & Emerson's most recent work with O&M costs being adjusted due to the number and size of thickeners.

4. Table 8.2-14 - The concept of Chapter 8 was maintained for revisions to this Table in that options were viewed as satisfying the needs of whatever alternative was chosen. The Engineering News Record Index was used on construction costs. Revisions to O&M costs included an increase in labor to \$19.00 per hour; an increase to material and supplies and chemicals using the Engineering News Record Index and adjustment to monitoring based on labor increases. Fees were revised to \$10/cu.yd. for sludge disposal and \$20/1,000 gallons for processing thickened sludge at Bergen Point. A reduction of \$25,000 was incorporated into the option for 2L due to the reduced sludge generated from that process.

5. Table 8.3-1 - This table assumes equalization at S. D. No. 10 with the necessary revisions to the main pumping station at that site. Pump station and force main costs were updated using the Engineering News Record Index as well as information available through the bidding and design of the Port Jefferson facility. The power and labor requirements were adjusted based on more recent information and the revisions to the plans under consideration. The labor requirements considered a savings in travel time and in efficiency when pumping stations are located on the same site as the plant, as compared to being at a remote location.

6. Table 8.3-2, 3 & 4 - These tables were adjusted based on the results of the previous tables and indicate that the most cost effective alternative is Alternative 1A. Other alternatives in order of cost effectiveness included 2C-2 (plus 7%), 2C (plus 10%), and 2L (plus 29%). It is noted in these tables that the costs of outfall construction which have been discussed above bring the alternatives closer together. The percentage difference between 2L and other options is less than 10%.

c. Reserve Capacity

Regulations which must be considered for Fiscal Year 1985 grants include reserve capacity of facilities. Revisions to Chapter 8 have not dealt with the aspect for the following reasons.

1. S. D. No. 1 and S. D. NO. 10 will have reached their saturated sewage flows by the initiation of operation (projected for 1988).

2. The widely fluctuating flows at SUNY and the need to provide adequate treatment for the University needs would not reduce the design flow of 2.0 MGD by more than .2 or .3 MGD by 1988. With most options the costs associated with a 10% increase in flow would not change the cost effective analysis or the conclusions drawn from Chapter 8.

TABLE 8.2-1

ALTERNATIVE TREATMENT PLANTS AND EFFLUENT LIMITATIONS ^{a.}

ALT. NO.	PLANT FLOW (mgd)	TREATMENT LEVEL	BOD ₅ (mg/l)		S.S. (mg/l)		Total-N (mg/l)	
			30 day Avg.	7 day Avg.	30 day Avg.	7 day Avg.	30 day Avg.	7 day Avg.
1A	3.2	Secondary	30	45	30	45	b	b
2C	2.5		(or 85%		(or 85%			
2C-2	3.2		removal)		removal)			
2C	.7							
2L	2.5	Advanced	30	45	30	45	10 ^c	10 ^c
			(or 85%		(or 85%			
			removal)		removal)			

a. See Chapter 3 for complete effluent limitations.

b. No limitation on nitrogen for secondary discharge to Port Jefferson Harbor. (11/1/78)

c. Federal and State standards for discharge to groundwater allow a maximum of 10 mg/l Total-N.

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TABLE 8.2-3

UNIT SIZING CRITERIA

SECONDARY TREATMENT

UNIT PROCESS	Average Design Flow (mgd)		
	.7	2.5	3.2
<u>PRIMARY TREATMENT</u>			
1. Gravity Sedimentation - gpd/ft ²	800	800	800
2. Fine Screening - gpm/ft ²	-	-	-
<u>MECHANICAL AND DIFFUSED AERATION</u>			
3. Aeration Detention (wo/recycle) - hours	7.2	5.4	5.9
4. Mixed Liquor Suspended Solids - mg/l	2500	2500	2500
5. Organic Load - lb BOD/1000 ft ³	35	35	35
<u>ROTATING BIOLOGICAL CONTACTOR</u>			
6. Hydraulic Load - gpd/ft ²	2.8	2.4	2.3
<u>EXTENDED AERATION (ORBAL)</u>			
7. Aeration Detention (wo/recycle) - hours	15	-	-
8. Mixed Liquor Suspended Solids - mg/l	6000	-	-
9. Organic Load - lb BOD/1000 ft ³	20	-	-
<u>TRICKLING FILTER TOWERS</u>			
10. Hydraulic Load (wo/recycle) - gpm/ft ²	0.53	0.70	0.63
11. Organic Load - lb BOD/1000 ft ³	40	40	40
12. Treatability Factor @ 10°C	0.6	0.6	0.6
13. Tower Height - feet	21	21	21
<u>FINAL CLARIFIERS</u>			
14. Overflow Rate - gpd/ft ²	400	400	400
<u>DISINFECTION</u>			
15. NaOCl (Equivalent Cl ₂) mg/l	10	10	10

TABLE 8.2-15

COST EFFECTIVE COMPARISON OF SOLID STREAM ALTERNATIVES

<u>Alternative/ Annual Cost</u>	<u>Technical</u>	<u>Environmental</u>	<u>Implementation</u>
S1 Land Application \$570,000 (+23%)	Second Lowest Capital Cost	<ul style="list-style-type: none"> • Reuse • Possible impact on ground water quality 	<ul style="list-style-type: none"> • Contractual arrangement with farmer/nurseryman
S2 Landfill \$541,000 (+17%)	<ul style="list-style-type: none"> • Lowest O & M Cost • Simple O&M 	<ul style="list-style-type: none"> • Disposal, not reuse • No major impacts 	<ul style="list-style-type: none"> • Uncertainty with future Town disposal method
S4 Bergen Point \$462,000	<ul style="list-style-type: none"> • Lowest Capital Cost • Simple O&M 	<ul style="list-style-type: none"> • Disposal, not reuse • No major impacts 	<ul style="list-style-type: none"> • Contractual arrangement with Southwest Sewer District • Annual cost sensitive to factors affecting fees
S3 Composting \$759,000 (+64%)	<ul style="list-style-type: none"> • Highest Capital Cost • Highest O & M Cost • Complex O&M 	<ul style="list-style-type: none"> • Reuse • Site aesthetics, odors • No major impacts 	<ul style="list-style-type: none"> • Marketing program for reuse as soil conditioner by farmers, individuals and government

TABLE 8.2-4

MONETARY COSTS - SECONDARY TREATMENT AT SD 1

(Thousands of Dollars, January 1986 (1) Projected Prices)

ITEM	0.7 mgd (2L) (2C)					3.2 mgd (1A)				3.2 mgd (2C-2) C(2)
	A	B	C	D	E	A	B	C	D	
Pretreatment	173	173	173	173	173	334	334	334	334	173
Primary Treatment	76	76	76	76	76	496	496	496	496	76
Aeration Tank Structure	156	156	50	--	269	461	461	168	--	168
Aeration Equipment and Building	155	242	--	--	130	370	657	--	--	--
RBC Equipment and Enclosure	--	--	373	--	--	--	--	890	--	890
Trickling Filter Tower Package	--	--	--	268	--	--	--	--	647	--
Final Clarifiers	84	84	84	84	84	504	504	504	504	504
Recycle Pumping	118	118	--	160	118	260	260	--	420	--
Electrical Work	25	30	13	12	34	97	113	34	41	34
Site Work and Piping	60	71	60	60	62	252	282	242	244	242
Subtotal	847	955	829	833	946	2774	3107	2668	2686	2087
Contingencies Allowance-15 percent	127	142	124	125	142	416	466	400	403	313
Subtotal - Construction Cost	974	1098	953	958	1088	3190	3573	3068	3089	2400
Engineering, Legal and Administrative -20 percent	195	220	191	192	218	638	715	614	618	480
Interest During Construction-8.125%	79	89	77	78	88	259	290	249	251	195
Total Capital Cost	1248	1407	1221	1228	1394	4087	4578	3931	3958	3075
Salvage Value (.08)	(78)	(88)	(76)	(77)	(87)	(255)	(286)	(245)	(247)	(192)
Net Capital Cost	1170	1319	1145	1151	1307	3832	4292	3686	3711	2883
Equivalent Annual Capital Cost (.1028)	120	136	118	118	134	394	441	379	381	296

- A - Mechanical Aeration
- B - Diffused Aeration
- C - Rotating Biological Contactor
- D - Trickling Filter Tower
- E - Extended Aeration (oxidation ditch)

(1) From graph ENR Construction Cost Index $\frac{\text{January 86}}{\text{June 83}} = \frac{4530}{3780} = 1.2$

Use this ratio to update material, supplies and equipment

(2) Pretreatment and primary treatment for 0.7 mgd only

TABLE 8.2-4 (Continued)

MONETARY COSTS - SECONDARY TREATMENT AT SD 1

(Thousands of Dollars, January 1986 Projected Prices)

<u>ITEM</u>	0.7 mgd (2L)					3.2 mgd (1A)				3.2 mgd (2C-2) ³
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>C(2)</u>
Operating Horsepower (HP/year)	25	30	16	15	43	99	114	44	49	34
Operating Labor (hours/year)	3050	3050	1950	2260	2750	5320	5520	4020	4140	3437
Maintenance Labor (hours/year)	1580	1580	1010	1260	1410	2720	2870	2090	2230	1748
<u>Annual Operating Cost</u>										
Power 12¢/KwHr	19	24	12	12	34	77	89	34	38	27
Operating Labor \$19.00/Hr	58	58	37	43	52	101	105	76	79	65
Subtotal	77	82	49	55	86	178	194	115	117	92
<u>Annual Maintenance Cost</u>										
Maintenance Labor \$19.00/Hr	30	30	19	24	27	52	55	40	42	33
Materials and Supplies	34	34	30	29	32	92	92	85	84	85
Subtotal	64	64	49	63	59	144	147	125	126	118
TOTAL ANNUAL O & M COST	141	146	98	118	145	322	341	235	243	210
EQUIVALENT ANNUAL CAPITAL COST	120	136	118	118	134	394	441	379	381	296
TOTAL ANNUAL MONETARY COST	261	282	216	236	279	716	782	614	624	506

- (a) A = Mechanical Aeration
- B = Diffused Aeration
- C = Rotating Biological Contactor
- D = Trickling Filter Tower
- E = Extended Aeration

(b) Includes chemicals

(3) SUNY primary treatment must be added for comparison to liquid treatment.

TABLE 8.2-5

MONETARY COST - SUNY

(Thousands of Dollars, January 1986 Projected Prices)

ITEM	Secondary Treatment 2.5 mgd (2C)					Advanced Treatment (2L)	Primary Treatment (2C-2)
	A	B	C	D	E	F	
	<hr/>						
Pretreatment	359	359	359	359	359	359	306
Primary Treatment	147	147	147	147	--	--	445
Aeration Tank Structure	408	408	126	--	623	957	--
Aeration Equipment and Building	309	530	--	--	229	378	--
RBC Equipment and Enclosure	--	--	668	--	--	--	--
Trickling Filter Tower Package	--	--	--	545	--	--	--
Final Clarifier	362	362	362	362	362	442	--
Recycle Pumping	202	202	--	311	202	241	--
Disinfection	273	273	273	273	273	273	--
Electrical Work	59	68	20	42	62	94	--
Site Work & Piping	<u>161</u>	<u>181</u>	<u>142</u>	<u>155</u>	<u>158</u>	<u>355</u>	<u>--</u>
Subtotal	2280	2530	2097	2194	2268	3099	751
Contingencies Allowance - 15%	<u>342</u>	<u>380</u>	<u>315</u>	<u>329</u>	<u>340</u>	<u>465</u>	<u>113</u>
Subtotal - Construction Cost	2622	2910	2412	2523	2608	3564	864
Eng., Legal and Admin. - 20%	524	582	482	506	522	713	53
Interest During Construction - 8.125%	<u>213</u>	<u>236</u>	<u>196</u>	<u>205</u>	<u>212</u>	<u>290</u>	<u>70</u>
Total Capital Cost	3359	3728	3090	3234	3342	4567	987
Salvage Value (.08)	<u>(210)</u>	<u>(234)</u>	<u>(193)</u>	<u>(202)</u>	<u>(209)</u>	<u>(285)</u>	<u>69</u>
Net Capital Cost	3149	3494	2897	3032	3133	4282	918
EQUIVALENT ANNUAL CAPITAL COST (.1028)	324	359	298	312	322	440	94

(a) A = Mechanical Aeration; B = Diffused Aeration; C = Rotating Biological Contactor;
D = Trickling Filter Tower; E = Oxidation Ditch; F = Oxidation Ditch with Recharge

TABLE 8.2-5 (Continued)

MONETARY COST - SUNY

(Thousands of Dollars, January 1986 2.5 mgd Projected Prices)

ITEM	Secondary Treatment 2C					Advanced Treatment 2L	Primary 2C-2
	A	B	C	D	E	F	
Operating Horsepower (HP-yr)	67	78	26	36	88	159	2
Operating Labor (hours/yr)	4270	4570	3110	3320	4070	5100	870
Maintenance Labor (hours/yr)	2200	2340	1600	1790	2100	2630	430
<u>Annual Operating Cost</u>							
Power 12¢/KwHr	52	61	20	28	69	125	2
Operating Labor \$19/Hr	81	87	59	63	77	97	17
Subtotal	133	148	79	91	146	222	19
<u>Annual Maintenance Cost</u>							
Maintenance Labor \$19/Hr	42	44	30	34	40	50	8
Materials & Supplies (b)	71	71	66	65	65	116	-
Subtotal	113	115	96	99	105	166	8
TOTAL ANNUAL O & M COST	246	263	175	190	251	388	27
EQUIVALENT ANNUAL CAPITAL COST	324	359	298	312	322	440	94
TOTAL ANNUAL MONETARY COST	570	622	473	502	573	828	121

(a) A = Mechanical Aeration; B = Diffused Aeration; C = Rotating Biological Contactor;
D = Trickling Filter Tower; E = Oxidation Ditch; F = Oxidation Ditch with Recharge

(b) Includes chemicals.

TABLE 8.2-10

MONETARY COST - THICKENING OF LIQUID SLUDGE (a)
 (January 1986 Projected Prices)

		<u>1A/2C-2</u>	<u>2L & 2C</u>
Gravity Thickening - 30 ft. diameter		SD1	SD1, SUNY
 <u>Capital Cost (\$1,000)</u>			
Thickener(s)	SD1	110	110
	SUNY	-	110
Subtotal		<u>110</u>	<u>220</u>
Contingencies Allowance 15%		17	33
Subtotal - Construction Cost		<u>127</u>	<u>253</u>
Eng., Legal, Admin. 20%		25	51
Interest During Construction - 8.125%		10	21
Total Capital Cost		<u>162</u>	<u>325</u>
Salvage Value (.08)		<u>-10</u>	<u>-20</u>
Net Capital Cost		<u>152</u>	<u>305</u>
 EQUIVALENT ANNUAL CAPITAL COST (.1028)		16	31
Thickening			
Labor - \$19.00/Hr		10	21
Power - 12¢/KwHr		3	6
Material & Supplies		<u>3</u>	<u>6</u>
TOTAL ANNUAL O & M COST		16	33
 EQUIVALENT ANNUAL CAPITAL COST		<u>16</u>	<u>31</u>
TOTAL ANNUAL MONETARY COST		32	64

a- Transport to largest plant no longer required

TABLE 8.2-14

MONETARY COSTS - SLUDGE DISPOSAL ALTERNATIVES
(January 1986) Projected Prices)

	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Stabilization	Anaerobic Digestion	Anaerobic Digestion	Composting	
Conditioning	Chemical	Chemical	Chemical	
Dewatering	Belt Filter	Belt Filter	Belt Filter	
Final Disposal	Cake to Land Application	Cake to Landfill	Compost for Soil Conditioning	Bergen Point
<u>Construction Cost (\$1,000)</u>				
Sludge Pumping	336	336	336	336
Sludge Holding	-	-	336	336
Anaerobic Digestion	798	798	-	-
Belt Filter Bldg. & Chem. Cond.	840	840	840	-
Composting	-	-	1428	-
Trucking Cake	101	101	50	-
Trucking Liquid	-	-	-	456
Land Application	84	-	-	-
Modification to Blend Tank	-	-	-	168
Subtotal	<u>2159</u>	<u>2075</u>	<u>2990</u>	<u>1296</u>
Contingencies 15%	324	311	449	194
Subtotal Const. Cost	<u>2483</u>	<u>2386</u>	<u>3439</u>	<u>1490</u>
Eng., Legal & Admin. 20%	497	477	688	298
Interest During Const. 8.125%	<u>202</u>	<u>194</u>	<u>279</u>	<u>121</u>
Total Capital Cost	3182	3057	4406	1909
Salvage Value	-199	-191	-275	-119
Net Capital Cost	<u>2983</u>	<u>2866</u>	<u>4131</u>	<u>1790</u>
EQUIVALENT ANNUAL CAPITAL COST (.1028)	307	295	425	184

8DR-14

TABLE 8.2-14 (Continued)

MONETARY COSTS - SLUDGE DISPOSAL ALTERNATIVES
(Thousands of Dollars per year, January 1986 Projected Prices)

	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Stabilization	Anaerobic Digestion	Anaerobic Digestion	Composting	
Conditioning	Chemical	Chemical	Chemical	
Dewatering	Belt Filter	Belt Filter	Belt Filter	
Final Disposal	Cake to Land Application	Cake to Landfill	Compost for Soil Conditioning	Bergen Point
<u>Annual Operating Costs (\$1,000)</u>				
Power 12¢/KwHr	12	12	50	7
Chem. Cond.	17	17	17	-
Operating Labor \$19/Hr	91	91	128	79
Monitoring	<u>62</u>	<u>10</u>	<u>21</u>	<u> </u>
Subtotal	182	130	216	86
<u>Annual Maintenance Cost</u>				
Maintenance Labor \$19/Hr	23	23	41	13
Materials & Supplies	47	47	77	47
Fees (1)	<u>11</u>	<u>46</u>	<u>-</u>	<u>132(2)</u>
Subtotal	81	116	118	192
TOTAL ANNUAL O & M COST	263	246	334	278
EQUIVALENT ANNUAL CAPITAL COST	<u>307</u>	<u>295</u>	<u>425</u>	<u>184</u>
TOTAL ANNUAL MONETARY COST	570	541	759	462

(1) \$10.00/Cu Yd for dewatered sludge to landfill.

20/1,000 gal. for processing and disposal (includes sidestream cost and key money).

(2) Reduce cost by \$25,000 for 2L.

TABLE 8.3-1

MONETARY COST - TRANSPORT

(Thousands of Dollars January 1986 projected prices)

<u>CAPITAL COST FOR</u>		2C-2	
<u>PUMPING STATIONS</u>		<u>1A</u>	<u>2C & 2L</u>
SD 10	0.5 mgd	70	70
SD 10	0.5 mgd	421	421
SD 1	0.7 mgd	722	722
SUNY	2.5 mgd	-	238
SUNY	2.5 mgd	<u>61</u>	<u>61</u>
Subtotal		1274	1512
Contingencies 15%		<u>191</u>	<u>227</u>
Subtotal Construction		1465	1739
Eng., Legal, Admin. 20%		293	348
Interest During Const. 8 1/8%		<u>119</u>	<u>141</u>
Total Capital Cost		1877	2228
Salvage Value (.08)		<u>117</u>	<u>139</u>
Net Capital Cost		1760	2089
<u>CAPITAL COST FOR</u>			
<u>FORCE MAIN</u>			
SD10 to SUNY	10"	1177	1177
SD1 to SD1 Plant	10"	346	346
SUNY to SD 1 Plant	18"	1187	1187
SUNY to SUNY Plant	16"	-	55
Plant to P.S. (gravity)		-	<u>55</u>
Subtotal		2710	2820
Contingencies 15%		<u>407</u>	<u>423</u>
Subtotal Construction		3117	3243
Eng., Legal, Admin. 20%		623	649
Interest During Const. 8 1/8%		<u>253</u>	<u>263</u>
Total Capital Cost		3993	4155
Salvage Value (.13)		<u>405</u>	<u>422</u>
Net Capital Cost		3588	3733
Net Capital Cost (Combined PS & FM)		5348	5822
EQUIVALENT ANNUAL CAPITAL COST	550		599
(.1028)			

TABLE 8.3-1 (continued)

MONETARY COSTS - TRANSPORT

(Thousands of Dollars January 1986 projected prices)

	<u>2C-2 & 1A</u>	<u>2L & 2C</u>
Average Pumping Capacity (mgd)	4.2	6.7
Energy Use - 10 ³ KWH/year	527	690
Labor - (hours/year)	4270	4230

ANNUAL O & M COSTS

FOR PUMP STATION AND FORCE MAINS

Power (12¢/KWH)	63	83
Labor (\$19/HR)	81	80
Materials and Supplies	<u>6</u>	<u>7</u>
TOTAL ANNUAL O & M COSTS	150	170
EQUIVALENT ANNUAL CAPITAL COST	550	599
TOTAL ANNUAL MONETARY COST	700	769

TABLE 8.3-2

MONETARY COST - STUDY AREA - ALTERNATIVES 1A, 2C-2, 2C, 2L

(Thousands of Dollars per year January 1986 projected prices)

	1A		2C-2		2C		2L	
	<u>Equiv. Capital</u>	<u>O & M</u>	<u>Equiv. Capital</u>	<u>O & M</u>	<u>Equiv. Capital</u>	<u>O & M</u>	<u>Equiv. Capital</u>	<u>O & M</u>
1. Collection & Transport	550	150	550	150	599	170	599	170
2. Treatment SD-1	379	235	296	210	118	98	118	98
SUNY	-	-	94	27	298	175	440	388
Sub Total	<u>379</u>	<u>235</u>	<u>390</u>	<u>237</u>	<u>416</u>	<u>273</u>	<u>558</u>	<u>486</u>
3. Sludge Disposal (S4)								
Thickening	16	16	16	16	31	33	31	33
Pump, Digest, Dewater & Truck to Land Appl.	<u>184</u>	<u>278</u>	<u>184</u>	<u>278</u>	<u>184</u>	<u>278</u>	<u>184</u>	<u>278</u>
Sub Total	200	294	200	294	215	311	215	311
TOTAL ANNUAL O & M COST		679		681		754		967
EQUIVALENT ANNUAL CAPITAL COST	1129		1140		1230		1372	
TOTAL ANNUAL MONETARY COST	1808		1821 (+.7%)		1984 (+10%)		2339 (+29%)	

Note: The outfall extension increases Alternate 1A, 2C-2 and 2C by an Annual Monetary Cost at \$330,000/yr. All alternatives are then within 10% or less than Alternate 1A.

TABLE 8.3-3
 LOCAL COSTS - ALTERNATIVES 1A, 2C-2, 2C, 2L
 (Thousands of Dollars - January 1986 Projected Prices)

	1	2	3	4	5	6	7	8	9	10	11	12	13
ALT. NO.	SERVICE AREA	CONST. COST INCLUDING CONTINGENCIES	ENG., LEGAL & ADMIN.	PROJECT CAPITAL COST	FED. & STATE GRANTS	LOCAL CAP. SHARE	INTEREST DURING CONST.	LOCAL CAP. COST	ANNUAL LOCAL DEBT SERVICE	ANNUAL O & M	LOCAL ANNUAL COST	EDU	\$/EDU/YR
1A	SD 1	2253	448	2701	2043	658	225	883	91	152	243	2690	90
	SD 10	2936	587	3523	2663	860	294	1154	67	156	223	1925	116
	SUNY	4077	816	4893	3696	1197	408	1605	165	371	536	7700	70
2C-2	SD 1	2331	367	2698	2070	628	233	861	89	147	236	2690	88
	SD 10	2960	539	3499	2528	871	296	1167	69	157	226	1925	117
	SUNY	4171	624	4795	3704	1091	417	1508	155	377	532	7700	69
2C	SD 1	2634	527	3161	2193	968	263	1231	127	213	340	2690	126
	SD 10	3025	600	3625	2519	1106	303	1409	94	158	252	1925	131
	SUNY	4413	891	5304	3690	1614	441	2055	211	383	594	7700	77
2L	SD 1	2634	527	3161	1969	1192	263	1455	150	213	363	2690	135
	SD 10	3256	647	3903	2433	1470	326	1796	133	196	329	1925	171
	SUNY	5352	1075	6427	4000	2427	535	2962	304	546	850	7700	110

S4 - Disposal at Bergen Point

- Column Notes:
- 2) Construction cost plus 15% for contingencies.
 - 3) Engineering, Legal and Administrative 20% times column 2
 - 4) Project Capital Cost = Columns 2 plus 3
 - 5) Eligible Costs = Project cost for each district times the ratio at the total project capital cost for the most effective alternative (1A) to the total project capital cost of the alternative being considered. Assume Federal and State shares at 55 and 22.5 per cent, respectively.
 - 6) Local Capital Share = Project Cost minus Federal and State Grants. Column 4 minus 5.
 - 7) Interest during construction = 10%. 0.1 times column 2.
 - 8) Local Capital Cost - Column 6 plus 7.
 - 9) Annual Local Debt Service = Bonding at 8 per cent for 30 years (CFR = .1028).
 - 10) Annual O & M - Assumes no available State aid for O & M. Costs are flow proportional.
 - 11) Local Annual Costs = Column 9 plus 10.
 - 12) EDU = 260 gpd = 75 gpcd X 3.5 c/EDU.
 - 13) Total is average \$/EDU/yr for all three service areas.

Note: Amortized outfall costs for Alt. 1A, 2C-2 and 2C amount to \$30/EDU/yr. and must be added to Column 13.

TABLE 8.3-4

TOTAL LOCAL ANNUAL COSTS

<u>Service Area</u>	<u>Alternative (Table 8.3-3)</u>	<u>Existing Debt Service</u>	<u>Existing O & M Collection</u>	<u>Total</u>
SD 10 (\$/EDU/yr) (\$/yr)	116-171 223,000 - 329,000	85 137,000	28 45,000	229-284 268,000 - 374,000
SD 1 (\$/EDU/yr) (\$/yr)	88-135 236,000 - 363,000	11 57,000	4 20,000	103-150 256,000 - 383,000
SUNY (\$/EDU/yr) (\$/yr)	-- 532,000 - 850,000	-- --	-- 25,000	-- 557,000 - 875,000

Note: Amortized outfall cost for Alternatives add \$30/EDU/yr. and \$231,000/yr. for SUNY. This cost must be added to the Total Local Annual Cost.

8DR-20