

LIST OF TABLES

Table 3-1	Description of existing drainage areas
Table 6-1	Freshwater wetland conceptual alternatives
Table 7-1	Hydrologic budget results
Table 8-1	Overall performance results of freshwater alternatives
Table 8-2	10-year NJDOT design event performance
Table 9-1	Estimated solids loading rates
Table 9-2	Estimated solids deposition rates
Table 10-1	Estimated first construction costs for freshwater wetland alternatives



TABLE 10-1

**ESTIMATED FIRST CONSTRUCTION COSTS
FRESHWATER WETLAND ALTERNATIVES,
LIBERTY STATE PARK, NEW JERSEY**

<i>ALTERNATIVE</i>	<i>DEEP WATER MARSH</i>	<i>BIOFILTER</i>	<i>LIBERTY SCIENCE CENTER WETLAND</i>	<i>INFILTRATION BASIN</i>	<i>TOTAL DOLLARS</i>
A	v	v	Absent	Absent	\$477,863.
B	v	v	Existing	Absent	\$551,756.
C	v	v	Enhanced	Absent	\$764,994.
D	v	v	Enhanced	Present	\$1,155,522.
AVERAGE					\$737,533.

Notes:

Cost estimates based on professional experience combined with standard cost estimates from published estimating tools such as RS Means©.

Table 3-1 - Description of Existing Drainage Areas					
Location	Description	Size (ac)	Impervious Area (%)	Slope (%)	Width (ft)
Liberty State Park	Existing wetland	20.01	0	1.0	-
	East Ditch	12.62	0	0.1	300
Science Center	Parking lot	10.40	89	0.5	700
	Science Center	6.47	34	1.0	550
LSC Wetland	Wetland	11.13	9	1.0	310
NJ Transit	Main lot	11.54	97	1.0	600
	Main Detention Basin	0.90	5	1.0	100
	Southern Detention Basin	2.75	40	1.0	185
	Northern Swale/Detention	2.40	55	1.0	170

Table 6-1. Freshwater Wetland Conceptual Alternatives:

Alt	Main Wetland Complex	Plus	Connection
A	Deep emergent marsh + biofilter with input from the Liberty Science Center drainage area		Swales. Overflow routed back to the existing drainage system.
B	Deep emergent marsh + biofilter with input from the Liberty Science Center drainage area	Existing LSC wetland with NY Transit drainage with excess flow routed to the biofilter	Swales. Overflow routed back to the existing drainage system.
C	Deep emergent marsh + biofilter with input from the Liberty Science Center drainage area	Enhanced LSC wetland with NY Transit drainage with excess flow routed to the biofilter	Swales. Overflow routed back to the existing drainage system.
D	Deep emergent marsh + biofilter with input from the Liberty Science Center drainage area	Enhanced LSC wetland with NY Transit drainage with excess flow routed to the biofilter	Overland flow conduits. Overflow routed to a recharge basin within the park.

TABLE 7-1

SUMMARY OF HYDROLOGIC BUDGET SCENARIO RESULTS

Average Monthly Storage Change (ft3):

Meteorologic Condition	Plan 1	Plan 2	Plan 3
Current Year	19,066	126,948	292,124
Last 10 Years (1993-2002)	7,775	81,735	205,421
Driest Three Years (1976, 1981, 2001)	266	51,789	148,307
Wettest Three Years (1983, 1984, 1996)	22,523	139,209	312,537

Table 8.1. Overall Performance Results of Freshwater Alternatives

Alternative	Maintains Biofilter WSEL	Maintains DEM Depth	Outflow from DEM
Alternative A	Yes	>3.5 feet	Infrequent
Alternative B	Yes	>4.0 feet	Frequent
Alternative C	Yes*	>4.0 feet*	Frequent*
Alternative D	Yes	>4.0 feet*	Frequent
*Similar performance to Alternative 2 WSEL: Water Surface Elevation DEM: Deep Emergent Marsh			

Table 8-2. 10-year NJDOT Design Event Performance

Alternative	Maximum WSEL - West of Phillip Street (ft NAVD)	Maximum WSEL – Biofilter (ft NAVD)
Alternative A	7.0	7.0
Alternative B*	7.0	7.0
Alternative D	6.8	6.7
*similar performance for Alternative C		

TABLE 9-1

PROJECTED SEDIMENT LOADINGS (POUNDS)

TSS Concentration: 31 mg/l (from Schueler Table 1.3; verified by Fig. 1.3)
 Sediment removal eff: 60.0%

2003:

<u>Sediment transported (lbs)</u>	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
NJ Transit Pkg.Lot runoff	181	190	332	172	228	694	171	537	369				2874
LSC Wetland Solids Settled	108	114	199	103	137	416	103	322	222				1725
LSC Wetland Solids Flowing Through	72	76	133	69	91	278	68	215	148				1150
LSC Parking Lot runoff	136	144	251	130	172	524	129	405	279				2169
Biofilter Solids Settled	125	132	230	119	158	481	119	372	256				1992
Biofilter Solids Flowing Through	83	88	153	79	105	320	79	248	171				1328
Upland Catchment runoff	17	18	32	16	22	66	16	51	35				275
Deep Water Emergent Wetland Solids Settled	60	64	111	57	76	232	57	180	124				961
Deep Water Emergent Wetland Solids Flowing Through	40	42	74	38	51	155	38	120	82				641

Last 10 Years:

<u>Sediment transported (lbs)</u>	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
NJ Transit Pkg.Lot runoff	247	174	334	244	248	222	259	218	298	206	203	218	2870
LSC Wetland Solids Settled	148	104	200	147	149	133	155	131	179	124	122	131	1722
LSC Wetland Solids Flowing Through	99	69	133	98	99	89	103	87	119	83	81	87	1148
LSC Parking Lot runoff	187	131	252	184	187	167	195	164	225	156	153	164	2166
Biofilter Solids Settled	171	120	231	169	172	154	179	151	206	143	141	151	1988
Biofilter Solids Flowing Through	114	80	154	113	115	102	119	101	138	95	94	101	1326
Upland Catchment runoff	24	17	32	23	24	21	25	21	28	20	19	21	274
Deep Water Emergent Wetland Solids Settled	83	58	112	82	83	74	87	73	100	69	68	73	960
Deep Water Emergent Wetland Solids Flowing Through	55	39	74	54	55	49	58	49	66	46	45	49	640

Average of Driest Three Years:

<u>Sediment transported (lbs)</u>	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
NJ Transit Pkg.Lot runoff	156	205	237	168	240	179	236	122	225	198	68	207	2239
LSC Wetland Solids Settled	93	123	142	101	144	107	142	73	135	119	41	124	1344
LSC Wetland Solids Flowing Through	62	82	95	67	96	72	94	49	90	79	27	83	896
LSC Parking Lot runoff	117	155	179	127	181	135	178	92	170	150	51	156	1690
Biofilter Solids Settled	108	142	164	117	166	124	163	84	156	137	47	143	1552
Biofilter Solids Flowing Through	72	95	109	78	111	83	109	56	104	92	31	96	1034
Upland Catchment runoff	15	20	23	16	23	17	23	12	21	19	6	20	214
Deep Water Emergent Wetland Solids Settled	52	69	79	56	80	60	79	41	75	66	23	69	749
Deep Water Emergent Wetland Solids Flowing Through	35	46	53	38	53	40	53	27	50	44	15	46	499

Average of Wettest Three Years:

<u>Sediment transported (lbs)</u>	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
NJ Transit Pkg.Lot runoff	206	207	543	544	375	278	408	167	252	367	236	438	4022
LSC Wetland Solids Settled	124	124	326	326	225	167	245	100	151	220	142	263	2413
LSC Wetland Solids Flowing Through	83	83	217	218	150	111	163	67	101	147	94	175	1609
LSC Parking Lot runoff	156	156	410	411	283	210	308	126	190	277	178	331	3035
Biofilter Solids Settled	143	143	376	377	260	193	282	116	175	254	164	304	2786
Biofilter Solids Flowing Through	95	96	251	251	173	129	188	77	116	169	109	202	1858
Upland Catchment runoff	20	20	52	52	36	27	39	16	24	35	23	42	384
Deep Water Emergent Wetland Solids Settled	69	69	182	182	125	93	136	56	84	123	79	147	1345
Deep Water Emergent Wetland Solids Flowing Through	46	46	121	121	84	62	91	37	56	82	53	98	897

TABLE 9-2

PROJECTED SEDIMENT DEPOSITION RATES (INCHES/MONTH)

2003:	Porosity:	0.825													
	Density (kg/m3):	1,375													
	Surface areas (acres)														
	Deep Water Wetland:	1.54													
	Biofilter:	0.79													
	LSC Wetland:	2.3													
	<u>Sediment Depth (inches)</u>		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
	LSC Wetland Solids Settled	0.0009	0.0009	0.0016	0.0008	0.0011	0.0033	0.0008	0.0026	0.0018					0.0138
	Biofilter Solids Settled	0.0029	0.0031	0.0053	0.0028	0.0037	0.0112	0.0028	0.0086	0.0059					0.0463
	Deep Water Emergent Wetland Solids Settled	0.0007	0.0008	0.0013	0.0007	0.0009	0.0028	0.0007	0.0021	0.0015					0.0115
Last 10 Years:	<u>Sediment Depth (inches)</u>		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
	LSC Wetland Solids Settled	0.0012	0.0008	0.0016	0.0012	0.0012	0.0011	0.0012	0.0010	0.0014	0.0010	0.0010	0.0010	0.0010	0.0137
	Biofilter Solids Settled	0.0040	0.0028	0.0054	0.0039	0.0040	0.0036	0.0042	0.0035	0.0048	0.0033	0.0033	0.0035	0.0462	
	Deep Water Emergent Wetland Solids Settled	0.0010	0.0007	0.0013	0.0010	0.0010	0.0009	0.0010	0.0009	0.0012	0.0008	0.0008	0.0009	0.0114	
	<u>Sediment Depth (inches)</u>		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Average of Driest Three Years:	LSC Wetland Solids Settled	0.0007	0.0010	0.0011	0.0008	0.0011	0.0009	0.0011	0.0006	0.0011	0.0009	0.0003	0.0010	0.0107	
	Biofilter Solids Settled	0.0025	0.0033	0.0038	0.0027	0.0039	0.0029	0.0038	0.0020	0.0036	0.0032	0.0011	0.0033	0.0360	
	Deep Water Emergent Wetland Solids Settled	0.0006	0.0008	0.0009	0.0007	0.0010	0.0007	0.0009	0.0005	0.0009	0.0008	0.0003	0.0008	0.0089	
	<u>Sediment Depth (inches)</u>		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
	LSC Wetland Solids Settled	0.0010	0.0010	0.0026	0.0026	0.0018	0.0013	0.0020	0.0008	0.0012	0.0018	0.0011	0.0021	0.0193	
Average of Wettest Three Years:	Biofilter Solids Settled	0.0033	0.0033	0.0087	0.0088	0.0060	0.0045	0.0066	0.0027	0.0041	0.0059	0.0038	0.0071	0.0647	
	Deep Water Emergent Wetland Solids Settled	0.0008	0.0008	0.0022	0.0022	0.0015	0.0011	0.0016	0.0007	0.0010	0.0015	0.0009	0.0017	0.0160	