Table 6-1: *Bay Modification Alternatives*

Item	Applied Factors	Aeration of Grassy Bay with Existing Bathymetry	Aeration of Grassy Bay with Recontoured Bathymetry	Recontour of Grassy Bay- Fill to 4 ft below MLW Without Muck Removal	Recontour of Grassy Bay- Fill to 4 ft below MLW Without Muck Removal (Season Restricted Fill)	Recontour of Grassy Bay- Fill to 4 ft below MLW With Muck Removal	Recontour of Grassy Bay- Fill to 4 ft below MLW With Muck Removal (Season Restricted Fill)	Recontour of Grassy Bay- Fill to 8 ft below MLW Without Muck Removal	Recontour of Grassy Bay- Fill to 8 ft below MLW Without Muck Removal(Season Restricted Fill)	Recontour of Grassy Bay- Fill to 8 ft below MLW With Muck Removal	Recontour of Grassy Bay- Fill to 8 ft below MLW With Muck Removal(Season Restricted Fill)	Recontour of Grassy Bay And North Channel- Fill to 8 ft below MLW Without Muck Removal	Recontour of Grassy Bay And North Channel- Fill to 8 ft below MLW Without Muck Removal(Season Restricted Fill)
Jamaica WPCP Shaft		0	0	0	0	0	0	0	0	0	0	0	0
26 Ward WPCP Shaft		0	0	0	0	0	0	0	0	0	0	0	0
Rockaway Shaft		0	0	0	0	0	0	0	0	0	0	0	0
Coney Island WPCP Shaft		0	0	0	0	0	0	0	0	0	0	0	0
Barren Island Shaft		0	0	0	0	0	0	0	0	0	0	0	0
Ocean Outfall Shaft		0	0	0	0	0	0	0	0	0	0	0	0
Rockaway Inlet Shaft		0	0	0	0	0	0	0	0	0	0	0	0
Jamaica to Rockaway Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Jamaica to 26 Ward Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
26 Ward to Rockaway Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Coney Island to Rockaway Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Jamaica to Barren Island Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
26 Ward to Barren Island Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Rockaway to Barren Island Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Rockaway to Ocean Outfall Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Barren Island to Rockaway Inlet Tunnel		0	0	0	0	0	0	0	0	0	0	0	0
Diffuser		0	0	0	0	0	0	0	0	0	0	0	0
Rockaway Pump Station Excavation and Soil Stabilization		0	0	0	0	0	0	0	0	0	0	0	0
Barren Island Pump Station Excavation and Soil Stabilization		0	0	0	0	0	0	0	0	0	0	0	0
Warf and Bulkhead-Rockaway		0	0	0	0	0	0	0	0	0	0	0	0
Warf and Bulkhead-26 Ward		0	0	0	0	0	0	0	0	0	0	0	0
Warf and Bulkhead-Barren Island		0	0	0	0	0	0	0	0	0	0	0	0
Sitework		19,204,328	5,770,007	0	0	0	0	0	0	0	0	0	0
Concrete		6,836,639	5,305,047	0	0	0	0	0	0	0	0	0	0
Masonry		785,184	441,716	0	0	0	0	0	0	0	0	0	0
Metals		899,657	548,876	0	0	0	0	0	0	0	0	0	0
Woods and Plastics		35,000	20,000	0	0	0	0	0	0	0	0	0	0
Thermal and Moisture Protection		218,121	118,988	0	0	0	0	0	0	0	0	0	0
Doors and Windows		55,346	95,775	0	0	0	0	0	0	0	0	0	0
Finishes		155,755	85,935	0	0	0	0	0	0	0	0	0	0
Specialties		51,061	51,061	0	0	0	0	0	0	0	0	0	0
Equipment and Mechanical Systems		4,187,814	3,117,017	0	0	0	0	0	0	0	0	0	0
Conveying System		174,134	167,483	0	0	0	0	0	0	0	0	0	0
Plumbing/HVAC		272,160	122,472	0	0	0	0	0	0	0	0	0	0
Force Main/Utility Relocation		0	0	0	0	0	0	0	0	0	0	0	0
Electrical		3,222,729	3,002,913	0	0	0	0	0	0	0	0	0	0
Electrical Building		0	0	0	0	0	0	0	0	0	0	0	0
Emergency Generator Area Site Work		0	0	0	0	0	0	0	0	0	0	0	0
Primary Power Area Site Work		0	0	0	0	0	0	0	0	0	0	0	0
Emergency Power		0	0	0	0	0	0	0	0	0	0	0	0
Primary Power Switchgear		0	0	0	0	0	0	0	0	0	0	0	0
Grassy Bay Recontouring		0	415,740	0	0	0	0	0	0	0	0	0	0
Mobilization/Demobilization		0	0	8,000,000	23,000,000	8,000,000	38,000,000	8,000,000	20,500,000	8,000,000	35,500,000	8,000,000	28,000,000
Removal of Bottom Muck		0	0	0	0	996,315,840	996,315,840	0	0	996,315,000	996,315,000	0	0
Fill		0	0	322,632,448	322,632,448	436,107,496	436,107,496	264,519,251	264,519,251	383,277,318	383,277,318	420,798,451	420,798,451
Cross Rockaway Fill Transport (Directional Drill)		0	0	51,264,000	51,264,000	51,264,000	51,264,000	51,264,000	51,264,000	51,264,000	51,264,000	51,264,000	51,264,000
Grassy Bay Aeration Headers/Diffusers		15,813,967	9,676,347	0	0	0	0	0	0	0	0	0	0
Temporary Treatment During Construction		0	0	0	0	0	0	0	0	0	0	0	0
Avoided UV Disinfection Installation Cost (TBD)		0	0	0	0	0	0	0	0	0	0	0	0
Avoided UV Disinfection Installation Cost (TBD)		0	0	0	0	0	0	0	0	0	0	0	0
BNR Structure		0	0	0	0	0	0	0	0	0	0	0	0
BNR Equipment		0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total		51,911,895	28,939,377	381,896,448	396,896,448	1,491,687,336	1,521,687,336	323,783,251	336,283,251	1,438,856,318	1,466,356,318	480,062,451	500,062,451
Scope Development (Design) Contingency @	20.0%	10,382,379	5,787,875	76,379,290	79,379,290	298,337,467	304,337,467	64,756,650	67,256,650	287,771,264	293,271,264	96,012,490	100,012,490
Sub-Total		62,294,274	34,727,252	458,275,738	476,275,738	1,790,024,803	1,825,024,803	388,539,901	403,539,901	1,726,627,582	1,759,627,582	576,074,941	600,074,941
Contract Allowances (BWT Add-Ons) @	7.0%	4,360,599	2,430,908	32,079,302	33,339,302	125,301,736	127,821,736	27,197,793	28,247,793	120,863,931	123,173,931	40,325,248	42,005,246
Sub-Total		66,654,873	37,158,160	490,355,039	509,615,039	1,915,326,539	1,953,846,539	415,737,694	431,787,694	1,847,491,512	1,882,801,512	616,400,187	642,080,187
General Conditions @	15.0%	9,998,231	5,573,724	73,553,256	76,442,256	287,298,981	293,076,981	62,360,654	64,768,154	277,123,727	282,420,227	92,460,028	96,312,028
Sub-Total		76,653,104	42,731,884	563,908,295	586,057,295	2,202,625,520	2,246,923,520	478,098,348	496,555,848	2,124,615,239	2,165,221,739	708,860,215	738,392,215
Payment Performance Bonds @	1.5%	1,149,797	640,978	8,458,624	8,790,859	33,039,383	33,703,853	7,171,475	7,448,338	31,869,229	32,478,326	10,632,903	11,075,883
Sub-Total		77,802,901	43,372,862	572,366,920	594,848,155	2,235,664,903	2,280,627,373	485,269,824	504,004,186	2,156,484,468	2,197,700,065	719,493,118	749,468,098
Contractor Overhead and Profit @	21.0%	16,338,609	9,108,301	120,197,053	124,918,112	469,489,630	478,931,748	101,906,663	105,840,879	452,861,738	461,517,014	151,093,555	157,388,301
Sub-Total		94,141,510	52,481,163	692,563,973	719,766,267	2,705,154,533	2,759,559,122	587,176,487	609,845,065	2,609,346,206	2,659,217,079	870,586,673	906,856,399
Construction Escalation @	0.0%	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total		94,141,510	52,481,163	692,563,973	719,766,267	2,705,154,533	2,759,559,122	587,176,487	609,845,065	2,609,346,206	2,659,217,079	870,586,673	906,856,399
Probable Bid Cost Total		**94,141,510**	**52,481,163**	**692,563,973**	**719,766,267**	**2,705,154,533**	**2,759,559,122**	**587,176,487**	**609,845,065**	**2,609,346,206**	**2,659,217,079**	**870,586,673**	**906,856,399**
Construction Reserve (Change Orders) @	10.0%	9,414,151	5,248,116	69,256,397	71,976,627	270,515,453	275,955,912	58,717,649	60,984,507	260,934,621	265,921,708	87,058,667	90,685,640
Sub-total		103,555,661	57,729,280	761,820,370	791,742,894	2,975,669,986	3,035,515,034	645,894,135	670,829,572	2,870,280,827	2,925,138,787	957,645,341	997,542,039
Probable Construction Cost Total (2004 $)		103,555,661	57,729,280	761,820,370	791,742,894	2,975,669,986	3,035,515,034	645,894,135	670,829,572	2,870,280,827	2,925,138,787	957,645,341	997,542,039
Probable Construction Cost Total (2006 $)	**1.18**	**122,195,680**	**68,120,550**	**898,948,036**	**934,256,815**	**3,511,290,584**	**3,581,907,740**	**762,155,080**	**791,578,895**	**3,386,931,375**	**3,451,663,768**	**1,130,021,502**	**1,177,099,606**
Soft Costs													
Environ Assesmt/ImpactStmt, Permitting		660,000	660,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000
Engineering/Architecture	10.0%	12,219,568	6,812,055	89,894,804	93,425,661	351,129,058	358,190,774	76,215,508	79,157,889	338,693,138	345,166,377	113,002,150	117,709,961
ConstructionManagement	15.0%	18,329,352	10,218,083	134,842,205	140,138,492	526,693,588	537,286,161	114,323,262	118,736,834	508,039,706	517,749,565	169,503,225	176,564,941
Fixed Asset Survey	0.5%	610,978	340,603	0	0	0	0	0	0	0	0	0	0
Other Professional Fees	3.0%	3,665,870	2,043,617	26,968,441	28,027,698	105,338,718	107,457,232	22,864,652	23,747,367	101,607,941	103,549,913	33,900,645	35,312,988
Subtotal		35,485,768	20,074,357	253,355,450	263,241,852	984,811,363	1,004,584,167	215,053,422	223,292,091	949,990,785	968,115,855	318,056,021	331,237,890
Soft Cost Contingency	15.0%	5,322,865	3,011,154	38,003,318	39,486,278	147,721,705	150,687,625	32,258,013	33,493,814	142,498,618	145,217,378	47,708,403	49,685,683
Staff Training and Development	LS	440,000	440,000	0	0	0	0	0	0	0	0	0	0
Probable Soft Cost Total		**41,248,634**	**23,525,510**	**291,358,768**	**302,728,130**	**1,132,533,068**	**1,155,271,792**	**247,311,436**	**256,785,904**	**1,092,489,403**	**1,113,333,233**	**365,764,424**	**380,923,573**
Other Costs													
Land Acquisition: Barren Island		0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: Knapp Street		0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: Jamaica		0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: Rockaway		0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: Coney Island		0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: 26th Ward (no purchase req.)		0	0	0	0	0	0	0	0	0	0	0	0
Setaside for Art	p	517,778	288,646	3,809,102	3,958,714	14,878,350	15,177,575	3,229,471	3,354,148	14,351,404	14,625,694	4,788,227	4,987,710
Probable Other Cost Total		**517,778**	**288,646**	**3,809,102**	**3,958,714**	**14,878,350**	**15,177,575**	**3,229,471**	**3,354,148**	**14,351,404**	**14,625,694**	**4,788,227**	**4,987,710**
TOTAL CONCEPTUAL PROJECT COST		**163,962,092**	**91,934,707**	**1,194,115,906**	**1,240,943,459**	**4,658,702,001**	**4,752,357,107**	**1,012,695,986**	**1,051,718,947**	**4,493,772,182**	**4,579,622,696**	**1,500,574,152**	**1,563,010,889**

I:\Projects\1024\065\cost estimates\[Probable Const. Cost and AEC.xls]C Alternatives

Table 6-2: *Combination Alternatives*

Item	Applied Factors	Recontour of Grassy Bay - Fill to 8 ft below MLW Without Muck Removal and Jamaica and 26th Ward WPCPs Relocated to Rockaway Inlet by Gravity	Grassy Bay Recontoured to 8 ft w/o Muck Removal (seasonal restricted Fill) and Jamaica and 26th Ward WPCPs Relocated to Rockaway Inlet by Gravity	Recontour of Grassy Bay- Fill to 8 ft below MLW With Muck Removal and Jamaica and 26th Ward WPCPs Relocated to Rockaway Inlet by Gravity	Grassy Bay Recontoured to 8 ft w/ Muck removal (seasonal restricted Fill) and Jamaica and 26th Ward WPCPs Relocated to Rockaway Inlet by Gravity	Jamaica & 26th Ward to Ocean - Submersible Pumps in CCT+BOD at Coney Island and Rockaway WPCPs adjusted to 30 mg/L	Jamaica & 26th Ward to Ocean - Submersible Pumps Wet Well/Dry Well+BOD at Coney Island and Rockaway adjusted to 30 mg/L	Jamaica & 26 Ward to Ocean - Mixed Flow Pumps Trench Wet Well+BOD at Coney Island and Rockaway adjusted to 30 mg/L	Level 2 At All WPCPs + Grassy Bay and North Channel Recontoured to 8 ft without muck removal	Level 2 At All WPCP+ Grassy Bay Recontoured to 8 ft without muck removal (Season Restricted Fill)	Level 2 at Rockaway & Coney Island WPCPs + Jamaica & 26th Ward Pumped to Rockaway Inlet	Level 2 BNR at Rockaway & Coney Island WPCPs + Jamaica & 26th Ward to Rockaway Inlet + Grassy Bay and North Channel Recontoured to 8 ft without muck removal	Level 2 at Rockaway & Coney Island WPCPs+ Jamaica & 26th Ward to Rockaway Inlet + Grassy Bay and North Channel Recontoured to 8 ft without muck removal(Season Restricted Fill)	Limit of Technology at ALL WPCPs + Grassy Bay Recontoured to 4 ft without muck removal	Limit of Technology at All WPCPs + Grassy Bay Recontoured to 4 ft without muck removal (Season Restricted Fill)	Level 2 Nitrification at Jamaica WPCP (Mod Flow Split)+26th Ward WPCP at Contract 12 Upgrade + Aeration of Grassy Bay
Jamaica WPCP Shaft		2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	0	0	2,000,000	2,000,000	2,000,000	0	0	0
26 Ward WPCP Shaft		3,700,000	3,700,000	3,700,000	3,700,000	3,700,000	3,700,000	3,700,000	0	0	3,700,000	3,700,000	3,700,000	0	0	0
Rockaway Shaft		0	0	0	0	5,400,000	5,400,000	5,400,000	0	0	0	0	0	0	0	0
Coney Island WPCP Shaft		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barren Island Shaft		4,100,000	4,100,000	4,100,000	4,100,000	0	0	0	0	0	4,100,000	4,100,000	4,100,000	0	0	0
Ocean Outfall Shaft		0	0	0	0	7,200,000	7,200,000	7,200,000	0	0	0	0	0	0	0	0
Rockaway Inlet Shaft		4,300,000	4,300,000	4,300,000	4,300,000	0	0	0	0	0	4,300,000	4,300,000	4,300,000	0	0	0
Jamaica to Rockaway Tunnel		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jamaica to 26 Ward Tunnel		66,899,000	66,899,000	66,899,000	66,899,000	59,300,000	59,300,000	59,300,000	0	0	63,076,200	63,076,200	63,076,200	0	0	0
26 Ward to Rockaway Tunnel		0	0	0	0	102,400,000	102,400,000	102,400,000	0	0	0	0	0	0	0	0
Coney Island to Rockaway Tunnel		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jamaica to Barren Island Tunnel		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 Ward to Barren Island Tunnel		111,181,500	111,181,500	111,181,500	111,181,500	0	0	0	0	0	93,249,000	93,249,000	93,249,000	0	0	0
Rockaway to Barren Island Tunnel		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rockaway to Ocean Outfall Tunnel		0	0	0	0	131,900,000	131,900,000	131,900,000	0	0	0	0	0	0	0	0
Barren Island to Rockaway Inlet Tunnel		70,284,750	70,284,750	70,284,750	70,284,750	0	0	0	0	0	60,460,000	60,460,000	60,460,000	0	0	0
Diffuser		9,923,645	9,923,645	9,923,645	9,923,645	66,468,560	66,468,560	66,468,560	0	0	9,923,645	9,923,645	9,923,645	0	0	0
Rockaway Pump Station Excavation and Soil Stabilization		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barren Island Pump Station Excavation and Soil Stabilization		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Warf and Bulkhead-Rockaway		0	0	0	0	10,000,000	10,000,000	10,000,000	0	0	0	0	0	0	0	0
Warf and Bulkhead-26 Ward		10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	0	0	10,000,000	10,000,000	10,000,000	0	0	0
Warf and Bulkhead-Barren Island		10,000,000	10,000,000	10,000,000	10,000,000	0	0	0	0	0	10,000,000	10,000,000	10,000,000	0	0	0
Sitework		7,039,029	7,039,029	7,039,029	7,039,029	2,689,541	9,820,936	6,882,615	0	0	6,882,615	6,882,615	6,882,615	0	0	19,204,328
Concrete		0	0	0	0	664,777	9,921,369	7,214,775	0	0	7,214,775	7,214,775	7,214,775	0	0	6,836,639
Masonry		0	0	0	0	6,095	1,061,314	0	0	0	0	0	0	0	0	785,184
Metals		0	0	0	0	763,732	904,339	55,736	0	0	55,736	55,736	55,736	0	0	899,657
Woods and Plastics		0	0	0	0	0	50,000	20,000	0	0	20,000	20,000	20,000	0	0	35,000
Thermal and Moisture Protection		0	0	0	0	5,392	513,310	107,677	0	0	107,677	107,677	107,677	0	0	218,121
Doors and Windows		0	0	0	0	0	135,986	0	0	0	0	0	0	0	0	55,346
Finishes		0	0	0	0	0	281,605	0	0	0	0	0	0	0	0	155,755
Specialties		0	0	0	0	0	29,792	0	0	0	0	0	0	0	0	51,061
Equipment and Mechanical Systems		0	0	0	0	10,375,466	11,209,015	9,612,383	0	0	9,612,383	9,612,383	9,612,383	0	0	4,187,814
Conveying System		0	0	0	0	341,616	337,994	0	0	0	0	0	0	0	0	174,134
Plumbing/HVAC		0	0	0	0	284,680	578,180	558,984	0	0	558,984	558,984	558,984	0	0	272,160
Force Main/Utility Relocation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrical		0	0	0	0	10,386,877	5,854,990	4,519,017	0	0	4,519,017	4,519,017	4,519,017	0	0	3,222,729
Electrical Building		0	0	0	0	1,012,174	0	1,267,602	0	0	1,267,602	1,267,602	1,267,602	0	0	0
Emergency Generator Area Site Work		0	0	0	0	419,402	423,078	1,242,140	0	0	1,242,140	1,242,140	1,242,140	0	0	0
Primary Power Area Site Work		0	0	0	0	261,060	264,556	285,242	0	0	285,242	285,242	285,242	0	0	0
Emergency Power		0	0	0	0	2,797,942	2,891,845	2,797,942	0	0	2,797,942	2,797,942	2,797,942	0	0	0
Primary Power Switchgear		0	0	0	0	2,003,014	2,131,411	2,003,014	0	0	2,003,014	2,003,014	2,003,014	0	0	0
Grassy Bay Recontouing		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mobilization/Demobilization		8,000,000	20,500,000	8,000,000	35,500,000	0	0	0	8,000,000	20,500,000	0	8,000,000	28,000,000	8,000,000	23,000,000	0
Removal of Bottom Muck		0	0	996,315,000	996,315,000	0	0	0	0	0	0	0	0	0	0	0
Fill		264,519,251	264,519,251	383,277,318	383,277,318	0	0	0	420,798,451	264,519,251	0	420,798,451	420,798,451	322,632,448	322,632,448	0
Cross Rockaway Fill Transport (Directional Drill)		51,264,000	51,264,000	51,264,000	51,264,000	0	0	0	51,264,000	51,264,000	0	51,264,000	51,264,000	51,264,000	51,264,000	0
Grassy Bay Aeration Headers/Diffusers		0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,813,967
Temporary Treatment During Construction		0	0	0	0	0	0	0	0	0	0	0	0	42,242,050	42,242,050	0
Avoided UV Disinfection Installation Cost (TBD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avoided UV Disinfection Installation Cost (TBD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR Structure		0	0	0	0	0	0	0	14,880,317	14,880,317	3,116,430	3,116,430	3,116,430	261,570,613	261,570,613	18,737,011
BNR Equipment		0	0	0	0	0	0	0	116,673,054	116,673,054	26,543,997	26,543,997	26,543,997	273,099,188	273,099,188	40,182,388
Sub-Total		623,211,175	635,711,175	1,738,284,242	1,765,784,242	430,380,328	444,778,280	434,935,687	611,615,822	467,836,622	327,036,399	807,098,850	827,098,850	958,808,299	973,808,299	110,831,294
Scope Development (Design) Contingency @	20.0%	124,642,235	127,142,235	347,656,848	353,156,848	86,076,066	88,955,656	86,987,137	122,323,164	93,567,324	65,407,280	161,419,770	165,419,770	191,761,660	194,761,660	22,166,259
Sub-Total		747,853,410	762,853,410	2,085,941,090	2,118,941,090	516,456,394	533,733,936	521,922,824	733,938,986	561,403,946	392,443,679	968,518,620	992,518,620	1,150,569,959	1,168,569,959	132,997,553
Contract Allowances (BWT Add-Ons) @	7.0%	52,349,739	53,399,739	146,015,876	148,325,876	36,151,948	37,361,376	36,534,598	51,375,729	39,298,276	27,471,058	67,796,303	69,476,303	80,539,897	81,799,897	9,309,829
Sub-Total		800,203,149	816,253,149	2,231,956,967	2,267,266,967	552,608,341	571,095,312	558,457,422	785,314,715	600,702,223	419,914,736	1,036,314,923	1,061,994,923	1,231,109,856	1,250,369,856	142,307,381
General Conditions @	15.0%	120,030,472	122,437,972	334,793,545	340,090,045	82,891,251	85,664,297	83,768,613	117,797,207	90,105,333	62,987,210	155,447,239	159,299,239	184,666,478	187,555,478	21,346,107
Sub-Total		920,233,621	938,691,121	2,566,750,512	2,607,357,012	635,499,592	656,759,608	642,226,035	903,111,923	690,807,556	482,901,947	1,191,762,162	1,221,294,162	1,415,776,334	1,437,925,334	163,653,488
Payment Performance Bonds @	1.5%	13,803,504	14,080,367	38,501,258	39,110,355	9,532,494	9,851,394	9,633,391	13,546,679	10,362,113	7,243,529	17,876,432	18,319,412	21,236,645	21,568,880	2,454,802
Sub-Total		934,037,125	952,771,488	2,605,251,769	2,646,467,367	645,032,086	666,611,002	651,859,426	916,658,602	701,169,669	490,145,476	1,209,638,594	1,239,613,574	1,437,012,979	1,459,494,214	166,108,291
Contractor Overhead and Profit @	21.0%	196,147,796	200,082,012	547,102,872	555,758,147	135,456,738	139,988,310	136,890,479	192,498,306	147,245,631	102,930,550	254,024,105	260,318,851	301,772,726	306,493,785	34,882,741
Sub-Total		1,130,184,922	1,152,853,500	3,152,354,641	3,202,225,514	780,488,824	806,599,313	788,749,905	1,109,156,908	848,415,300	593,076,026	1,463,662,699	1,499,932,425	1,738,785,705	1,765,987,999	200,991,032
Construction Escalation @	0.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total		1,130,184,922	1,152,853,500	3,152,354,641	3,202,225,514	780,488,824	806,599,313	788,749,905	1,109,156,908	848,415,300	593,076,026	1,463,662,699	1,499,932,425	1,738,785,705	1,765,987,999	200,991,032
Probable Bid Cost Total		1,130,184,922	1,152,853,500	3,152,354,641	3,202,225,514	780,488,824	806,599,313	788,749,905	1,109,156,908	848,415,300	593,076,026	1,463,662,699	1,499,932,425	1,738,785,705	1,765,987,999	200,991,032
Construction Reserve (Change Orders) @	10.0%	113,018,492	115,285,350	315,235,464	320,222,551	78,048,882	80,659,931	78,874,991	110,915,691	84,841,530	59,307,603	146,366,270	149,993,242	173,878,570	176,598,800	20,099,103
Sub-total		1,243,203,414	1,268,138,850	3,467,590,105	3,522,448,065	858,537,707	887,259,244	867,624,896	1,220,072,599	933,256,830	652,383,629	1,610,028,969	1,649,925,667	1,912,664,275	1,942,586,799	221,090,135
Probable Construction Cost Total (2004 $)		1,243,203,414	1,268,138,850	3,467,590,105	3,522,448,065	858,537,707	887,259,244	867,624,896	1,220,072,599	933,256,830	652,383,629	1,610,028,969	1,649,925,667	1,912,664,275	1,942,586,799	221,090,135
Probable Construction Cost Total (2006 $)	1.18	1,466,980,028	1,496,403,843	4,091,756,324	4,156,488,717	1,013,074,494	1,046,965,908	1,023,797,377	1,439,685,667	1,101,243,059	769,812,682	1,899,834,183	1,946,912,288	2,256,943,845	2,292,252,423	260,886,360
Soft Costs																
Environ Assesmt/ImpactStmt, Permitting		2,970,000	2,970,000	2,970,000	2,970,000	1,320,000	1,320,000	1,320,000	2,310,000	2,310,000	1,920,000	3,570,000	3,570,000	2,970,000	2,970,000	660,000
Engineering/Architecture	10.0%	146,698,003	149,640,384	409,175,632	415,848,872	101,307,449	104,696,591	102,379,738	143,968,567	110,124,306	76,981,268	189,983,418	194,691,229	225,694,385	229,225,242	26,088,636
ConstructionManagement	15.0%	220,047,004	224,460,577	613,763,449	623,473,308	151,961,174	157,044,886	153,569,607	215,952,850	165,186,459	115,471,902	284,975,128	292,036,843	338,541,577	343,837,863	39,132,954
Fixed Asset Survey	0.5%	7,334,900	7,482,019	20,458,782	20,782,444	5,065,372	5,234,830	5,118,987	7,198,428	5,506,215	3,849,063	9,499,171	9,734,561	11,284,719	11,461,262	1,304,432
Other Professional Fees	3.0%	44,009,401	44,892,115	122,752,690	124,694,662	30,392,235	31,408,977	30,713,921	43,190,570	33,037,292	23,094,380	56,995,026	58,407,369	67,708,315	68,767,573	7,826,591
Subtotal		417,248,533	425,487,201	1,152,185,895	1,170,310,966	290,046,231	299,705,284	293,102,253	406,970,307	312,206,377	221,316,614	539,372,635	552,554,504	641,704,256	651,590,658	75,012,613
Soft Cost Contingency	15.0%	62,587,280	63,823,080	172,827,884	175,546,645	43,506,935	44,955,793	43,965,338	61,045,546	46,830,957	33,197,492	80,905,895	82,883,176	96,255,638	97,738,599	11,251,892
Staff Training and Development	LS	440,000	440,000	440,000	440,000	440,000	440,000	440,000	660,000	660,000	840,000	840,000	840,000	880,000	880,000	660,000
Probable Soft Cost Total		480,275,813	489,750,281	1,325,453,780	1,346,297,610	333,993,165	345,101,076	337,507,590	468,675,854	359,697,334	255,354,106	621,118,530	636,277,680	738,839,894	750,209,256	86,924,504
Other Costs																
Land Acquisition: Barren Island		500,000	500,000	500,000	500,000	0	0	0	0	0	500,000	500,000	500,000	0	0	0
Land Acquisition: Knapp Street		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: Jamaica		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: Rockaway		0	0	0	0	172,176	172,176	172,176	0	0	0	0	0	172,176	172,176	0
Land Acquisition: Coney Island		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Land Acquisition: 26th Ward (no purchase req.)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Setaside for Art	p	6,216,017	6,340,694	17,337,951	17,612,240	4,292,689	4,436,296	4,338,124	6,100,363	4,666,284	3,261,918	8,050,145	8,249,628	9,563,321	9,712,934	1,105,451
Probable Other Cost Total		6,716,017	6,840,694	17,837,951	18,112,240	4,464,865	4,608,472	4,510,300	6,100,363	4,666,284	3,761,918	8,550,145	8,749,628	9,735,497	9,885,110	1,105,451
TOTAL CONCEPTUAL PROJECT COST		1,953,971,858	1,992,994,819	5,435,048,054	5,520,898,568	1,351,532,524	1,396,675,457	1,365,815,268	1,914,481,883	1,465,606,678	1,028,928,706	2,529,502,858	2,593,939,595	3,005,519,236	3,052,346,789	348,916,315

I:\Projects\1024\065\cost estimates\[Probable Const. Cost and AEC.xls]C Alternatives

Table 6-3 *List of target species for the proposed Jamaica Bay alternatives (from EEA 2004)*

Common Name	Scientific Name
Commercially and Recreationally Important Finfish Species	
American Eel	*Anguilla rostrata*
American Sandlance	*Ammodytes americanus*
Atlantic Menhaden	*Brevoortia tyrannus*
Atlantic Silverside	*Menidia menidia*
Atlantic Tomcod	*Microgadus tomcod*
Bay Anchovy	*Anchoa mitchilli*
Cunner	*Tautogolabrus adspersus*
Spotten Hake	*Urophycis regia*
Blackfish	*Tautoga onitis*
Weakfish	*Cynoscion regalis*
Shellfish and Crustaceans	
Hard Clam	*Mercenaria mercenaria*
Blue Crab	*Callinectes sapidus*
American Lobster	*Homarus americanus*
Sea Turtles & Marine Mammals	
Kemp's Ridley or Atlantic Ridley Sea Turtle	*Lepidochelys kempii*
Loggerhead Turtle	*Caretta caretta*
Harbor Seal	*Phoca vitulina concolor*
Harp Seal	*Phoca groenlandica*
Western North Atlantic Coastal Bottlenose Dolphin	*Tursiops truncatus*
Birds	
Mallard	*Anas platyrhynchos*
American Black Duck	*Anas rubripes*
Canada Goose	*Branta canadensis*
Northern Harrier	*Circus cyaneus*
Osprey	*Pandion haliaetus*
Short-eared Owl	*Asio flammeus*
Bald Eagle	*Haliaeetus leucocephalus*
Horned Lark	*Eremophila alpestris*
Rare Plant	
Seabeach Amaranth	*Amaranthus pumilus*
Dune Sandspur	*Cenchrus tribuloides*
Seabeach Knotweed	*Polygonum glaucum*
Tidal Wetland Vegetation	
Smooth Cordgrass	*Spartina alterniflora*
Saltmarsh Cordgrass	*Spartina patens*
Spikegrass	*Distichlis spicata*
Marsh Elder	*Iva frutescens*
Groundsel Bush	*Baccharis halimifolia*
Eelgrass[1]	*Zostera marina*
Widgeon Grass[1]	*Ruppia maritima*

[1] Not currently found in Jamaica Bay

Table 7-1
Baseline and BNR Scenarios - Winter Concentrations (mg/L)

WPCP		Baseline	Level 1 BNR	Level 2 BNR	Level 3 BNR	Nitrification Scenario B (Level 2 at Jamaica, Partially oxic + Contract 12 Upgrades at 26th Ward)	Limit of Technology
Coney Island	Organic Phosphorus	1.60	0.40	0.40	0.35	1.60	0.20
	Phosphate (PO_4)	0.99	1.35	1.45	1.55	0.99	1.65
	Organic Nitrogen	5.13	2.25	2.25	2.20	5.13	1.90
	Ammonia (NH_4)	13.00	8.40	6.50	3.40	13.00	0.50
	Nitrate and Nitrite (NO_2 + NO_3)	0.52	1.65	2.05	2.10	0.52	2.00
	Dissolved Silica (DSi)	7.22	7.22	7.22	7.22	7.22	7.22
	Organic Carbon	11.91	10.75	10.01	9.10	11.91	6.12
	BOD	7.02	7.44	6.95	6.30	7.02	4.20
	DO	3.82	6.05	5.00	5.00	3.82	5.00
26th Ward	Organic Phosphorus	0.80	0.40	0.30	0.30	0.34	0.10
	Phosphate (PO_4)	1.78	1.60	1.75	1.70	2.65	1.80
	Organic Nitrogen	3.82	2.15	2.00	2.15	2.20	1.30
	Ammonia (NH_4)	5.15	4.45	4.15	4.50	5.15	1.00
	Nitrate and Nitrite (NO_2 + NO_3)	1.33	10.05	4.90	2.25	2.90	2.00
	Dissolved Silica (DSi)	6.96	6.96	6.96	6.96	6.96	6.96
	Organic Carbon	15.20	10.39	9.35	8.71	9.18	3.33
	BOD	9.99	7.08	7.23	5.98	6.44	2.16
	DO	6.15	6.70	5.00	5.00	5.00	5.00
Rockaway	Organic Phosphorus	1.08	0.30	0.30	0.40	1.08	0.10
	Phosphate (PO_4)	1.68	2.80	2.90	2.70	1.68	2.90
	Organic Nitrogen	3.94	2.30	2.20	2.15	3.94	1.30
	Ammonia (NH_4)	4.10	2.55	2.60	1.25	4.10	1.00
	Nitrate and Nitrite (NO_2 + NO_3)	5.23	9.15	4.75	2.35	5.23	2.00
	Dissolved Silica (DSi)	7.82	7.82	7.82	7.82	7.82	7.82
	Organic Carbon	9.96	7.86	6.65	7.81	9.96	2.62
	BOD	5.01	5.41	4.55	5.42	5.01	1.69
	DO	7.97	8.60	5.00	5.00	7.97	5.00
Jamaica	Organic Phosphorus	1.06	0.40	0.40	0.40	0.40	0.20
	Phosphate (PO_4)	2.07	1.70	1.85	1.80	1.60	1.95
	Organic Nitrogen	8.29	2.35	2.30	2.30	2.40	1.90
	Ammonia (NH_4)	19.10	9.75	6.70	6.45	5.64	0.50
	Nitrate and Nitrite (NO_2 + NO_3)	0.40	5.50	5.00	2.00	5.35	2.00
	Dissolved Silica (DSi)	10.03	10.03	10.03	10.03	10.03	10.03
	Organic Carbon	19.15	11.24	10.32	10.07	11.22	6.84
	BOD	13.00	7.76	7.15	7.00	7.74	4.71
	DO	7.46	6.55	5.00	5.00	5.00	5.00

Table 7-2

Baseline and BNR Scenarios - Summer Concentrations (mg/L)

WPCP		Baseline	Level 1 BNR	Level 2 BNR	Level 3 BNR	Nitrification Scenario B (Level 2 at Jamaica, Partially oxic + Contract 12 Upgrades at 26th Ward)	Limit of Technology
Coney Island	Organic Phosphorus	1.60	0.40	0.40	0.35	1.60	0.20
	Phosphate (PO_4)	0.99	1.50	1.85	1.60	0.99	1.75
	Organic Nitrogen	5.13	2.25	2.30	2.20	5.13	1.85
	Ammonia (NH_4)	13.00	5.20	5.40	1.30	13.00	0.50
	Nitrate and Nitrite (NO_2 + NO_3)	0.52	3.20	6.60	2.25	0.52	2.00
	Dissolved Silica (DSi)	7.22	7.22	10.03	7.22	7.22	7.22
	Organic Carbon	11.91	10.01	10.89	8.68	11.91	5.87
	BOD	7.02	6.91	7.51	6.02	7.02	4.02
	DO	3.82	4.30	5.45	5.00	3.82	5.00
26th Ward	Organic Phosphorus	0.80	0.30	0.40	0.30	0.30	0.10
	Phosphate (PO_4)	1.78	1.70	1.50	1.75	2.75	1.90
	Organic Nitrogen	3.82	2.10	2.25	2.10	2.05	1.20
	Ammonia (NH_4)	1.33	2.50	5.20	1.00	3.05	0.60
	Nitrate and Nitrite (NO_2 + NO_3)	5.15	8.65	3.20	2.25	5.40	2.00
	Dissolved Silica (DSi)	6.96	6.96	7.22	6.96	6.96	6.96
	Organic Carbon	15.20	9.53	10.01	8.15	8.39	3.30
	BOD	9.99	6.49	6.91	5.59	5.91	2.12
	DO	6.15	5.65	4.30	5.00	5.00	5.00
Rockaway	Organic Phosphorus	1.08	0.30	0.30	0.40	1.08	0.10
	Phosphate (PO_4)	1.68	2.90	1.90	2.80	1.68	2.95
	Organic Nitrogen	3.94	2.20	1.90	2.05	3.94	1.30
	Ammonia (NH_4)	4.10	1.60	2.25	0.40	4.10	0.60
	Nitrate and Nitrite (NO_2 + NO_3)	5.23	6.90	5.20	2.45	5.23	2.00
	Dissolved Silica (DSi)	7.82	7.82	6.96	7.82	7.82	7.82
	Organic Carbon	9.96	7.40	8.22	7.42	9.96	2.58
	BOD	5.01	5.08	5.61	5.13	5.01	1.74
	DO	7.97	6.75	5.00	5.00	7.97	5.00
Jamaica	Organic Phosphorus	1.06	0.40	0.30	0.40	0.40	0.20
	Phosphate (PO_4)	2.07	1.85	2.90	1.85	1.75	2.05
	Organic Nitrogen	8.29	2.30	2.20	2.25	2.40	1.90
	Ammonia (NH_4)	19.10	5.40	1.60	1.90	1.10	0.50
	Nitrate and Nitrite (NO_2 + NO_3)	0.40	6.60	6.90	2.00	6.20	2.00
	Dissolved Silica (DSi)	10.03	10.03	7.82	10.03	10.03	10.03
	Organic Carbon	19.15	8.43	5.77	9.80	10.62	6.76
	BOD	13.00	7.51	5.08	6.80	7.31	4.70
	DO	7.46	5.45	6.75	5.00	5.00	5.00

Table 7-3 Baseline and BNR Scenarios - Annual Loads (lbs/Day)

WPCP		Baseline	Level 1 BNR	Level 2 BNR	Level 3 BNR	Nitrification Scenario B (Level 2 at Jamaica, Partially oxic + Contract 12 Upgrades at 26th Ward)	Limit of Technology
Coney Island	Organic Phosphorus	1,500	400	400	300	1,500	200
	Phosphate (PO_4)	900	1,300	1,400	1,400	900	1,600
	Organic Nitrogen	4,400	2,100	2,000	2,000	4,700	1,700
	Ammonia (NH_4)	11,200	6,300	4,700	2,200	12,000	500
	Nitrate and Nitrite (NO_2 + NO_3)	400	2,200	2,900	2,000	500	1,800
	Dissolved Silica (DSi)	6,600	6,600	6,600	6,600	6,600	6,600
	Organic Carbon	11,000	9,500	8,300	8,200	11,000	5,500
	BOD	6,500	6,600	5,000	5,700	6,500	3,800
	DO	3,500	4,800	4,600	4,600	3,500	4,600
26th Ward	Organic Phosphorus	500	200	200	200	200	100
	Phosphate (PO_4)	1,100	1,000	1,100	1,000	1,600	1,100
	Organic Nitrogen	2,100	1,300	1,200	1,300	1,300	700
	Ammonia (NH_4)	1,800	2,100	1,900	1,600	2,400	500
	Nitrate and Nitrite (NO_2 + NO_3)	1,800	5,500	3,000	1,300	2,400	1,200
	Dissolved Silica (DSi)	4,100	4,100	4,100	4,100	4,100	4,100
	Organic Carbon	9,000	5,900	5,200	5,000	5,200	2,000
	BOD	5,900	4,000	3,800	3,400	3,600	1,300
	DO	3,600	3,600	3,000	3,000	3,000	3,000
Rockaway	Organic Phosphorus	200	100	100	100	200	0
	Phosphate (PO_4)	400	600	700	600	400	700
	Organic Nitrogen	800	500	500	500	900	300
	Ammonia (NH_4)	900	500	500	200	900	200
	Nitrate and Nitrite (NO_2 + NO_3)	1,100	1,800	900	500	1,200	500
	Dissolved Silica (DSi)	1,800	1,800	1,800	1,800	1,800	1,800
	Organic Carbon	2,200	1,700	1,500	1,700	2,200	600
	BOD	1,100	1,200	1,000	1,200	1,100	400
	DO	1,800	1,700	1,100	1,100	1,800	1,100
Jamaica	Organic Phosphorus	800	300	300	300	300	200
	Phosphate (PO_4)	1,600	1,400	1,500	1,400	1,300	1,600
	Organic Nitrogen	6,200	1,800	1,800	1,800	1,900	1,500
	Ammonia (NH_4)	14,200	6,000	4,200	3,300	2,700	400
	Nitrate and Nitrite (NO_2 + NO_3)	300	4,800	4,000	1,600	4,600	1,600
	Dissolved Silica (DSi)	7,900	7,900	7,900	7,900	7,900	7,900
	Organic Carbon	15,200	8,800	7,900	7,900	8,600	5,400
	BOD	10,300	6,000	5,500	5,500	6,000	3,700
	DO	5,900	4,700	4,000	4,000	4,000	4,000

Table 7-4

Bottom Dissolved Oxygen Standard Attainment - Baseline Scenarios

	Annual		Summer	
	% of Time Bottom DO > than 5 mg/L		% of Time Bottom DO > than 5 mg/L	
	Average Grassy Bay	Average Baywide	Average Grassy Bay	Average Baywide
Permit Conditions (Baseline)	80.2	95.9	32.4	85.5
Existing Conditions	81.1	96.2	35.4	86.7
1995-96 Conditions	77.6	94.6	24.8	81.4

Table 7-5

Bottom Dissolved Oxygen Standard Attainment - Treatment Scenarios

	Annual		Summer	
	% of Time Bottom DO > than 5 mg/L		% of Time Bottom DO > than 5 mg/L	
	Average Grassy Bay	Average Baywide	Average Grassy Bay	Average Baywide
Permit Conditions (Baseline)	80.2	95.9	32.4	85.5
Level 1 BNR	83.7	96.8	44.0	88.7
Level 2 BNR	84.6	97.2	46.3	90.0
Level 3 BNR	85.7	97.7	48.9	91.5
Nitrification Scenario B (Level 2 at Jamaica, Partially oxic + Contract 12 Upgrades at 26th Ward)	85.0	97.3	47.8	90.2
Limit of Technology	91.3	98.7	66.6	95.0

Table 7-6

Bottom Dissolved Oxygen Standard Attainment - Outfall Relocation Scenarios

	Annual		Summer	
	% of Time Bottom DO > than 5 mg/L		% of Time Bottom DO > than 5 mg/L	
	Average Grassy Bay	Average Baywide	Average Grassy Bay	Average Baywide
Permit Conditions (Baseline)	80.2	95.9	32.4	85.5
Jamaica WPCP Outfall Relocated to Atlantic Ocean	94.2	99.0	78.2	96.2
Jamaica and 26th Ward WPCP Outfalls Relocated to Atlantic Ocean	97.2	99.5	88.9	97.9
Jamaica, 26th Ward and Rockaway WPCP Outfalls Relocated to Atlantic Ocean	98.4	99.7	93.6	98.6
All WPCP Outfalls Relocated to Atlantic Ocean	98.8	99.7	95.3	98.9
Jamaica and 26th Ward WPCP Outfalls Relocated to Rockaway Inlet	96.5	99.3	86.3	97.4
All WPCP Outfalls Relocated to Rockaway Inlet	97.5	99.5	90.1	98.1

Table 7-7

Bottom Dissolved Oxygen Standard Attainment - Recontouring Scenarios

	Annual		Summer	
	% of Time Bottom DO > than 5 mg/L		% of Time Bottom DO > than 5 mg/L	
	Average Grassy Bay	Average Baywide	Average Grassy Bay	Average Baywide
Permit Conditions (Baseline)	80.2	95.9	32.4	85.5
Grassy Bay Recontoured to 4 ft	91.0	97.8	64.9	89.5
Grassy Bay Recontoured to 8 ft	87.6	96.8	58.7	88.8
Grassy Bay and North Channel Recontoured to 8 ft	86.0	96.1	55.1	86.9

Table 7-8

Bottom Dissolved Oxygen Standard Attainment - Combination Scenarios

	Annual		Summer	
	% of Time Bottom DO > than 5 mg/L		% of Time Bottom DO > than 5 mg/L	
	Average Grassy Bay	Average Baywide	Average Grassy Bay	Average Baywide
Permit Conditions (Baseline)	80.2	95.9	32.4	85.5
Nitrification Scenario B (Level 2 at Jamaica, Partially oxic + Contract 12 Upgrades at 26th Ward) + Grassy Bay and North Channel Filled to 8 ft	90.9	98.0	70.5	92.9
BNR Level 2 + 26th W and JA WPCPs relocated to RI	97.4	99.5	89.4	97.9
GB recontoured to 8 ft and 26W and JA WPCPs relocated to Rockaway Inlet by gravity flow (Alternative 12)	99.6	99.7	98.7	99.0

Table 7-9. CORMIX Inputs
Water Column/Effluent Characteristics used in CORMIX

Depth (m)	U (m/s)	Stratification	Density Bottom σ - t	Density Surface σ - t	Effluent Temp (C)
18.3	0.95	Intermediate	22.8	21.7	23.9
22.4	0.108	Intermediate	22.9	21.7	23.9
30.2	0.179	Intermediate	23.1	21.5	23.9
18.3	0.095	Maximum	23.8	22.4	23.8
22.4	0.108	Maximum	23.9	22.4	23.8
30.2	0.179	Maximum	23.9	21.9	23.8

Table 7-10. Diffuser Information

Type	Length (m)	No. of Openings	Spacing (m)	Port Diameter (cm)	Nozzle Arrangement
Alternating perpendicular	1225	400	25	12.7	Alternating with fanning
Alternating perpendicular	1500	488	25	12.7	Alternating with fanning
Alternating perpendicular	2000	648	25	12.7	Alternating with fanning

Table 7-11 CORMIX Inputs and Results for Intermediate Stratification Conditions

Water Depth (m)	U (m/s)	Stratification Min (sigma-t)	Stratification Max (sigma-t)	Effluent Flow (MGD)	Effluent Temp (°C)	Dilution at Edge of NFR	Plume Width (m)	Plume Thickness (m)	NFR Location x (m)	NFR Location y (m)	NFR Location z (m)	Plume Height (m)
	Avg	Intermediate										
18.3	0.095	21.7	22.8	300	23.91	129.6	1,237.3	14.5	31.6	0.0	13.1	18.3
18.3	0.095	21.7	22.8	200	23.91	151.7	1,235.5	11.3	26.5	0.0	11.6	17.2
18.3	0.095	21.7	22.8	100	23.91	212.8	1,233.5	8.0	17.8	0.0	9.6	13.5
22.4(1)	0.108	21.7	22.9	500	23.91	132.2	2,012.0	13.3	33.8	0.0	12.6	19.3
22.4(2)	0.108	21.7	22.9	500	23.91	136.0	1,515.6	18.2	48.2	0.0	15.0	22.4
22.4	0.108	21.7	22.9	500	23.91	103.0	3,703.6	5.6	1,851.8	0.0	16.1	18.9
22.4	0.108	21.7	22.9	400	23.91	137.1	1,240.5	17.9	48.2	0.0	14.9	22.4
22.4	0.108	21.7	22.9	300	23.91	153.6	1,238.9	15.1	45.5	0.0	13.6	21.1
22.4	0.108	21.7	22.9	200	23.91	181.9	1,236.9	11.9	40.6	0.0	11.9	17.9
22.4	0.108	21.7	22.9	100	23.91	244.9	1,234.0	8.1	26.1	0.0	9.5	13.6
30.2	0.179	21.5	23.1	780	23.91	122.8	1,243.4	18.9	74.6	0.0	15.6	25.1
30.2	0.179	21.5	23.1	700	23.91	127.2	1,242.5	17.5	74.3	0.0	15.1	23.9
30.2	0.179	21.5	23.1	600	23.91	134.0	1,241.4	15.9	73.4	0.0	14.3	22.3
30.2	0.179	21.5	23.1	500	23.91	143.2	1,240.1	14.1	71.8	0.0	13.5	20.5
30.2	0.179	21.5	23.1	400	23.91	156.1	1,238.6	12.3	69.1	0.0	12.5	18.6
30.2	0.179	21.5	23.1	300	23.91	163.6	1,236.0	9.7	51.4	0.0	11.1	16.0
30.2	0.179	21.5	23.1	200	23.91	199.3	1,234.4	7.9	42.5	0.0	9.7	13.6
30.2	0.179	21.5	23.1	100	23.91	318.8	1,233.0	6.3	28.1	0.0	8.1	11.2

Near Field Region (NFR) - a term used in the CORMIX printout for describing the zone of strong initial mixing where the so called near-field processes occur. It is the region of the receiving water where outfall design conditions are most likely to have an impact on in-stream concentrations.

(1) - 2000 m diffuser

(2) - 1500 m diffuser

Table 7-12 CORMIX Inputs and Results for Maximum Stratification Conditions

Water Depth (m)	U (m/s)	Stratification Min (sigma-t)	Stratification Max (sigma-t)	Effluent Flow (MGD)	Effluent Temp (°C)	Dilution at Edge of NFR	Plume Width (m)	Plume Thickness (m)	NFR Location x (m)	NFR Location y (m)	NFR Location z (m)	Plume Height (m)
	Avg	Maximum										
18.3	0.095	22.4	23.8	300	23.76	111.6	1235.4	12.5	21.7	0.0	12.2	18.3
18.3	0.095	22.4	23.8	200	23.76	133.3	1234.2	10.0	18.0	0.0	10.9	15.9
18.3	0.095	22.4	23.8	100	23.76	203.3	1233.3	7.6	15.3	0.0	9.3	13.1
22.4(1)	0.108	22.4	23.9	500	23.76	147.4	2013.6	14.9	42.8	0.0	13.4	20.9
22.4(2)	0.108	22.4	23.9	500	23.76	118.4	1503.4	15.9	36.7	0.0	13.8	21.8
22.4	0.108	22.4	23.9	500	23.76	88.4	3681.7	4.9	950.7	0.0	14.7	17.1
22.4	0.108	22.4	23.9	400	23.76	118.2	1238.2	15.5	36.0	0.0	13.7	21.4
22.4	0.108	22.4	23.9	300	23.76	132.2	1236.9	13.0	33.3	0.0	12.5	19.0
22.4	0.108	22.4	23.9	200	23.76	155.5	1235.2	10.2	27.4	0.0	11.0	16.1
22.4	0.108	22.4	23.9	100	23.76	224.3	1233.3	7.4	18.0	0.0	9.1	12.8
30.2	0.179	21.9	23.9	780	23.76	112.8	1241.8	17.3	63.8	0.0	14.8	23.4
30.2	0.179	21.9	23.9	700	23.76	116.8	1241.0	16.1	63.5	0.0	14.3	22.3
30.2	0.179	21.9	23.9	600	23.76	123.2	1240.0	14.6	62.6	0.0	13.5	20.8
30.2	0.179	21.9	23.9	500	23.76	131.7	1238.8	13.0	61.1	0.0	12.7	19.2
30.2	0.179	21.9	23.9	400	23.76	143.8	1237.5	11.4	58.4	0.0	11.8	17.5
30.2	0.179	21.9	23.9	300	23.76	151.3	1235.2	9.0	41.7	0.0	10.6	15.0
30.2	0.179	21.9	23.9	200	23.76	184.8	1233.7	7.3	31.5	0.0	9.2	12.9
30.2	0.179	21.9	23.9	100	23.76	314.7	1232.9	6.3	25.8	0.0	7.9	11.1

Near Field Region (NFR) - a term used in the CORMIX printout for describing the zone of strong initial mixing where the so called near-field processes occur. It is the region of the receiving water where outfall design conditions are most likely to have an impact on in-stream concentrations.

(1) - 2000 m diffuser

(2) - 1500 m diffuser

Table 7-13. Dye Runs

WPCPs Included	Depth (ft)
All	57
All	60
All	60*
All	73
All	84
All	99
Jamaica, 26th Ward, Rockaway	60
Jamaica, 26th Ward, Rockaway	73
Jamaica, 26th Ward	73
Jamaica	60

* discharged into two adjacent segments

Table 7-14. Permit TRC Concentrations (mg/l)

WPCP	TRC
26th Ward	0.45
Coney Island	0.64
Jamaica	0.53
Rockaway	0.59

Table 7-15.

Scenario	WPCP	Minimum Travel Time (Hrs)	End of Pipe Concentration (mg/l)	Flow Weighted $\overline{\quad}$ (mg/l)
Jamaica to Ocean	Jamaica	2.9	0.42	0.42
Jamaica + 26th Ward to Ocean	Jamaica	4.4	0.37	0.36
	26th Ward	3.5	0.34	
All WPCPs to Ocean	Jamaica	6.2	0.32	0.35
	26th Ward	5.4	0.29	
	Coney Island	5.3	0.41	
	Rockaway	3.7	0.43	