Appendix Table A
Bay Park Sewage Treatment Plant
Flood Mitigation Alternatives

Table A:
Bay Park Sewage Treatment Plant Flood Mitigation Alternatives
Nassau County Department of Public Works

No.	Name	Description	Pros	Cons	Positive Environmental Impacts	Negative Environmental Impacts	Proposed Mitigation for Negative Environmental Impacts
1	No Action Alternative	No modifications to the existing project site.	No disruption to neighbors associated with construction of flood mitigation measures.	Facility generators still at risk of being inundated with floodwater, which will cause extensive damage to equipment and electrical systems in addition to causing Plant to be out of service	No direct consequences on geology and soil resources, wetland resources, coastal resources, or vegetation.	Would not prevent discharge of untreated wastewater to the surrounding bodies of water or wetlands during a severe flood event.	Since this alternative does not include any modifications to the existing site/facility conditions, mitigation of negative environmental impacts has not been developed.
			See "Positive Environmental Impacts"	Plant at risk for service disruption due to flood-induced damages, causing pumps to stop operating and raw sewage to back up along pipelines through lower Nassau County. This will cause sewage to flood into the streets and potentially into residents' homes.	No direct consequences on transportation or traffic.	Negative public health impacts during a flood event that takes the plant out of service.	
			--	During a significant flood event that takes the Plant out of service, 550,000 residents of Nassau County will no longer have access to wastewater services	No direct impact on wildlife, fish, threatened/endangered species, migratory birds, archaeological resources, land use, or historic structures.	--	
				Risk to the facility related to flooding damages will increase over time, as storm frequency and sea level rise are anticipated to increase.	No noise impacts related to construction or other activities since this alternative does not include any changes to existing conditions at the site.		
				See "Negative Environmental Impacts"	No direct impact on wildlife, fish, threatened/endangered species, migratory birds, archaeological resources, land use, or historic structures.		

Table A:
Bay Park Sewage Treatment Plant Flood Mitigation Alternatives
Nassau County Department of Public Works

No.	Name	Description	Pros	Cons	Positive Environmental Impacts	Negative Environmental Impacts	Proposed Mitigation for Negative Environmental Impacts
2	Proposed Alternatve: Perimeter Flood Protection Berm and Flood Wall	Construct a flood protection barrier composed of earthen levee and flood wall that extends around the perimeter of the Bay Park STP to provide a primary means of defense against flooding. The earthen levee/concrete flood wall will protect against the 500-year flood event. This will require improvements to the adjacent County-owned recreational park as well as an adjacent roadway (Marjorie Lane).	Conveyance and critical treatment operations will be able to continue in the event of a flood.	Disrupts more land relative to other alternatives, including the adjacent county-owned recreational park and Marjorie Lane.	Flood wall will result in improved noise attenuation for neighbors.	Incidental soil disturbance during construction (excavation for foundation elements, grading, installing piles and slurry walls, and other associated earthwork).	The Contractor will be required to use erosion and sediment controls and obtain any required permits.
			All facility buildings and assets will be protected from flood damage up to the 500-year flood event.	Potential to induce off-site flooding, though minimal.	Relocating Marjorie Lane away from the water will reduce runoff from the road to the water body, improving water quality.	Will distrurb approximately 37 acres of land, which could lead to contaminated stormwater runoff - potentially into Reynold's Channel.	The Contractor will be required to prepare a SWPPP including erosion and sediment controls.
			Includes improvements to recreational public park.	See "Negative Environmental Impacts"	Improved aesthetics for neighbors since plant operation will no longer be visible.	Traffic is anticipated to be heavier than normal during construction, especially during the specified delivery hours.	The Contractor will be required to submit maintenance and protection of traffic plans as necessary.
			After preparing benefit-cost analyses using FEMA's BCA Toolkit, this was proven the most cost-effective.	--	Incorporates green infrastructure designs including vegetated bioswales and underground stormwater retention.	Noise impacts are anticipated throughout construction, although the alternative will ultimately result in improved noise attenuation.	A general noise attenuation plan and determination of working hours will receive community input. Specification 02228 - Noise and Vibration Controls will be followed.
			Flood wall height accounts for anticipated sea level rise.		Will provide additional protection to coastal resources due to reduction of raw wastewater released from future flood events.	A relatively small area of existing lawn and upland landscape areas will be converted to impervious cover; however, overall floodplain function will not be altered.	--
			Benefits to human health, safety, and welfare by preventing raw sewage backup and allowing continuous plant functionality.		Landscaping included in the proposed alternative will provide a more diverse wildlife habitat and add to the aesthetic quality of the community.	--	
			See "Positive Environmental Impacts"		No direct impact on wildlife, fish, threatened/endangered species, migratory birds, archaeological resources, land use, or historic structures.		

Table A:
Bay Park Sewage Treatment Plant Flood Mitigation Alternatives
Nassau County Department of Public Works

No.	Name	Description	Pros	Cons	Positive Environmental Impacts	Negative Environmental Impacts	Proposed Mitigation for Negative Environmental Impacts
3	Other Action Alternative: Mitigate All Systems and Equipment Individually	Protect the STP's Tier 1 (most critical) through Tier 4 buildings and systems by construction flood walls around individual buildings/systems or elevating equipment as necessary. Flood walls and elevations would protect against the 500-year flood event.	Conveyance and critical treatment operations will be able to continue in the event of a flood.	For those assets elevated and not protected by a flood wall, building damage could still occur.	This alternative would incorporate green infrastructure such as vegetated bioswales and retention/detention areas.	Disturbance to soils during construction (similar to the proposed alternative).	The Contractor will be required to use erosion and sediment controls and obtain any required permits.
			The height of the flood walls and elevations would account for anticipated climate change, including rising sea levels.	See "Negative Environmental Impacts"	Will provide additional protection to coastal resources due to the reduction of uncontrolled release of wastewater from future flood events.	Anticipated to disturb approximately 2 acres of land, which could lead to contaminated stormwater runoff - potentially into Reynold's Channel.	The Contractor will be required to prepare a SWPPP including erosion and sediment controls.
			Disturbs less land than the proposed alternative (2 acres as opposed to 37 acres).	--	No direct impact on vegetation.	Traffic is anticipated to be heavier than normal during construction, especially during the specified delivery hours and especially near	The Contractor will be required to submit maintenance and protection of traffic plans as necessary.
			Lower potential to induce off-site flooding than the proposed alternative.		No direct impact on wildlife, fish, threatened/endangered species, migratory birds, archaeological resources, land use, or historic structures.	Noise impacts are anticipated throughout construction, although the alternative will ultimately result in improved noise attenuation.	A general noise attenuation plan and determination of final working hours will be prepared and vetted with the community prior to the commencement or project tasts. The Contractor will also be required to follow Specification Section 02228 - Noise and Vibration Controls.
			See "Positive Environmental Impacts"		Improved noise attenuation and aesthetics for neighbors.	Use of individual flood walls will increase the amount of impervious surface within the facility.	--

Table A:
Bay Park Sewage Treatment Plant Flood Mitigation Alternatives
Nassau County Department of Public Works

No.	Name	Description	Pros	Cons	Positive Environmental Impacts	Negative Environmental Impacts	Proposed Mitigation for Negative Environmental Impacts
4	Relocation	Relocate entire facility to a location outside of the 500-year floodplain. The adjacent land currently used as a golf course was proposed, as this land is at a higher elevation than the existing STP, and buildings could be designed to be above the 500-year flood elevation.	All facility assets would be protected from damages due to flooding, allowing for the continuous functionality of plant operations during a flooding event.	Difficulty finding land in population-dense area (aside from the proposed adjacent golf course, which is at a higher elevation than the existing facility location but still susceptible to flooding).	New plant would be able to implement state-of-the-art technologies to improve effluent quality.	Significant environmental regulatory issues to be addressed during the development process.	Since this alternative was dismissed early on, mitigation of negative environmental impacts has not been developed.
			Plant could continue its operations uninterrupted while the new plant is constructed.	Anticipated high costs and disruptions to roadways, as a potentially long stretch of pipe will have to be installed to convey treated wastewater from the new facility to the outfall.			
			New plant would be able to implement state-of-the-art technologies and processes to enhance efficiency, effluent quality, and maintain requirements.	Anticipated high costs and large-scale disruptions to roadways to redirect all collection and interceptor infrastructure as well as construction of new pumping and metering stations.			
			See "Positive Environmental Impacts"	Longer anticipated construction time to construct an entire new facility rather than mitigate the existing via the other alternatives, thus leaving the existing facility at risk to flooding for a longer period of time than the alternatives.			
			--	Loss of recreational land for public use until the existing facility can be demolished and the land converted.			
				See "Negative Environmental Impacts"			

Appendix Table B
Spill Incident Summary

Table B: Spill Incident Summary

	Spill Number	Date Spill Reported	Spill Name	County	City/Town	Address
1	301654	5/15/2003	TREATMENT PLANT BAY PARK	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
2	401927	5/21/2004	UNKNOWN	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
3	503013	6/13/2005	BAY PARK SEWER	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
4	503213	6/16/2005	BAYPARK WATER TREATMENT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
5	508840	10/24/2005	BAYPARK WATER TREATMENT FACILITY	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
6	602903	6/15/2006	BAYPARK SEWAGE	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
7	709633	12/6/2007	FACILITY	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
8	711855	2/11/2008	BAY PARK SEWER	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
9	913854	3/30/2010	BAY PARK SEWER PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
10	1010716	1/18/2011	NASSAU CO BAYPORT SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
11	1010754	1/19/2011	BAY PARK SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
12	1010859	1/24/2011	BAY PARK SEWER PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
13	1013038	3/31/2011	BAY PARK WASTE WATER TREATMENT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
14	1102262	5/29/2011	NASSAU COUNTY SEWER PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
15	1102278	5/30/2011	NASSAU COUNTY SEWAGE TREATMENT	NASSAU	EAST ROCKAWAY	3 MARJORIE LANE
16	1103447	6/27/2011	NCDPW	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
17	1105872	8/23/2011	SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
18	1106069	8/28/2011	SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
19	1108352	9/30/2011	BAY PARK SEWER PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
20	1109376	10/26/2011	EAST ROCKAWAY SEWER PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
21	1110448	11/23/2011	TEMPORARY GBT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
22	1111377	12/21/2011	NCDPW	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
23	1200908	4/28/2012	BAY PARK SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
24	1201446	5/15/2012	BAY PARK SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
25	1206766	10/9/2012	NASSAU CO SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
26	1207483	10/30/2012	BAY PARK SEWAGE PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
27	1300164	4/6/2013	BAY PARK STP	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
28	1301392	5/10/2013	BAY PARK SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE

Table B: Spill Incident Summary

29	1302608	6/11/2013	BAY PARK SEWAGE TREATMENT PLANT	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
30	1307569	10/23/2013	BAY PARK STP	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE
31	1308878	12/4/2013	BAY PARK STP	NASSAU	EAST ROCKAWAY	2 MARJORIE LANE/4TH AVENUE

Appendix Table C
Environmental Site Remediation

Table C: Environmental Site Remediation

	Site Code	Site Name	Program	Site Class	County	City/town	Address
1	C130123	Ellman International, Inc.	BCP	N	NASSAU	Oceanside	3345 Royal Avenue
2	C130168	Former National Loan Investors Site	BCP	N	NASSAU	Oceanside	3333 Royal Avenue
3	130066	Railroad Dry Cleaners	HW	2	NASSAU	Oceanside	3180 Lawson Boulevard
4	130168	Former National Loan Investors Site	HW	P	NASSAU	Oceanside	3333 Royal Avenue

Appendix Table D1
Federal and New York State
Ambient Air Quality Standards

Table D1: Federal and New York State Ambient Air Quality Standards

Pollutant	Avg. Period	Federal Air Quality Standards				New York State Standards 1	
		Primary Standard		Secondary Standard			
		Level 3	Statistic 2	Level	Statistic	Level	Statistic
Carbon Monoxide	8-hour	9 ppm	Maximum	None		9 ppm	Maximum
	1-hour	35 ppm	Maximum			35 ppm	Maximum
Lead 4	Quarterly average	1.5 µg/m³, effective until 12/31/12	Maximum	Same as Primary		None	
	Rolling 3 month average (2008 standard)	0.15 µg/m³, effective 1/1/13	Maximum	Same as Primary		None	
Nitrogen Dioxide	Annual	0.053 ppm	Arithmetic Mean	Same as Primary		0.05 ppm	Arithmetic Mean
	1-hour	0.100 ppm 5	3 year avg	0.053 ppm	Arithmetic Mean	None	
Total Suspended Particulates (TSP) 6	12 consecutive months	None		None		75 µg/m³	Geometric Mean
	24-hours	260 µg/m³	Maximum	150 µg/m³	Maximum	250 µg/m³	Maximum
Particulate Matter (PM10) 7	24-hour	150 µg/m³	Maximum	Same as Primary		None	
Particulate Matter ($PM_{2.5}$)	Annual	12 µg/m³	Arithmetic Mean	Same as Primary		None	
	24-hour	35 µg/m³ 8	3 year avg	Same as Primary			
Ozone 9	8-hour (2008 std)	0.075 ppm	3 year avg	Same as Primary		None	
	8-hour (1997 std)	0.08 ppm	3 year avg	Same as Primary		0.08 ppm	Maximum
	1-hour	0.12 ppm	Not Applicable in NYS 10	Same as Primary		0.12 ppm	Maximum
Sulfur Dioxide	Annual	0.03 ppm	Arithmetic Mean	None		0.03 ppm	Arithmetic Mean
	24-hour	0.14 ppm	Maximum			0.14 ppm	Maximum
	3-hour	None		0.5 ppm	Maximum	0.50 ppm	Maximum
	1-hour	75 ppb	3 year avg 11	None		None	
Hydrocarbons (non-methane)	3-hour (6-9 am)	None		None		0.24 ppm	Maximum

Table D1 Footnotes

Number	Description
1	New York State also has standards for beryllium, fluorides, hydrogen sulfide, and settleable particulates (dustfall). Ambient monitoring for these pollutants is not currently conducted.
2	All maximum values are concentrations not to be exceeded more than once per calendar year. (Federal 1 hour Ozone Standard not to be exceeded more than three days in three calendar years).
3	Gaseous concentrations for Federal standards are corrected to a reference temperature of 25°C and to a reference pressure of 760 millimeters of mercury.
4	Federal standard for lead not yet officially adopted by NYS. Based upon the November 22, 2011 EPA designation for areas of New York State, which became effective on 12/31/11, the 0.15 µg/m³ standard will be effective throughout New York State on 1/1/2013 will replace the previous level of 1.5 µg/m³. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard (12/31/12 throughout New York State).
5	The 0.100 ppm standard is effective 1/22/2010. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average within an area must not exceed 0.100 ppm.
6	New York State also has 30, 60, and 90-day standards as well as geometric mean standards of 45, 55, and 65 µg/m³ in Part 257 of NYCRR. While these TSP standards have been superseded by the above PM10 standards, TSP measurements may still serve as surrogates to PM10 measurements in the determination of compliance status.
7	Federal standard for PM_{10} not yet officially adopted by NYS, but is currently being applied to determine compliance status.
8	Federal standard was changed from 65 to 35 µg/m³ on December 17, 2006. Compliance with the Federal standard is determined by using the average of 98th percentile 24 hour value during the past three years, which can not exceed 35 µg/m³.
9	Former NYS Standard for ozone of 0.08 PPM was not officially revised via regulatory process to coincide with the Federal standard of 0.12 PPM which is currently being applied by NYS to determine compliance status. Compliance with the Federal 8 hour standards is determined by using the average of the 4th highest daily value during the past three years - which can not exceed 0.084 PPM or 0.075 PPM, effective May 27, 2008).
10	(a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
	(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
11	Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Appendix Table D2
NYSDEC Region 1
Ambient Air Background Concentrations

Table D2: NYSDEC Region 1 Ambient Air Background Concentrations

Polutant	Station	Averaging Period	Background Reading
Ozon	Babylon	8-hour	0.086 ppm
		1-hour	0.127 ppm
	Hotsville	8-hour	0.079 ppm
		1-hour	0.12 ppm
Nitrogen Dioxide	Hotsville	Annual	8.78 ppb
		1-hour	57.0 ppb*
Sulfur Dioxide	Hotsville	Annual	1.03 ppb
		24-hour	6.1 ppb
PM2.5	Babylon	Annual	8.4 ug/m3
		24-hour	23 ug/m3

* Only data for 2010 available

Appendix Table D3
Potential Emissions
from Construction Activity

Table D3: Potential Emissions from Construction Activity

Anticipated Length of Workday: 8 hours
Construction Activity Duration: 12 months
Work hours per Year: 1920 hours/year

Maximum Calculated Hourly Emissions Data

					NonRoad Emission Rates (tons/year), NR-009c, April 2004						
Equipment	**SCC**	**Equipment ID**	**Equipment Rated HP**	**Age of equip.**	**THC**	**CO**	**NO_X**	**SO_2**	**PM_{10}**	**PM_{10} (ULSD)[1]**	**$PM_{2.5}$ (ULSD)**
Excavator	2270002036	*EX*	200	10	***20.32***	***0.49***	***2.35***	***0.005***	***0.13***	***0.10***	***0.09***
Backhoe	2270002066	BH	150	10	***61.90***	***0.72***	***2.10***	***0.005***	***0.18***	***0.15***	***0.14***
FE Loader	2270002066	*FE*	150	10	***24.76***	***0.73***	***2.16***	***0.005***	***0.18***	***0.15***	***0.15***
Derrick Crane	2270002045	DC	250	10	***8.20***	***0.40***	***3.06***	***0.005***	***0.13***	***0.09***	***0.08***
Telescoping Crane	2270002045	TC	100	10	***3.60***	***0.19***	***1.29***	***0.005***	***0.06***	***0.04***	***0.04***
Concrete pump	2270006010	*CP*	50	10	***1.38***	***0.26***	***0.63***	***0.005***	***0.05***	***0.04***	***0.04***
Compressor	2270006015	Comp	50	10	***11.01***	***0.26***	***0.65***	***0.005***	***0.05***	***0.04***	***0.04***
Dewatering pump	2270006010	DP	*25*	10	***---***	***---***	***---***	***0.005***	***---***	***---***	***---***
Paver	2270002003	PAV	200	10	***27.09***	***0.49***	***2.30***	***0.005***	***0.13***	***0.10***	***0.09***
Rock drill (pneumatic)	2270002033	*RD3_Jack*	pneumatic	10	***---***	***---***	***---***	***---***	***---***	***---***	***---***
Rock Drill (1)	2270002033	*RD1_Crawl*	1	10	***0.08***	***0.00***	***0.01***	***0.005***	***0.00***	***0.00***	***0.00***
Pile drilling rig	2270002033	*PDR*	200	10	***39.37***	***---***	***---***	***0.005***	***---***	***---***	***---***
Drill rig (hydraulic)	2270002033	*DR*	200	10	***3.28***	***0.33***	***2.56***	***0.005***	***0.11***	***0.07***	***0.07***
Raise Bore Machine (Electric)	2270002033	*RBM*	300	10	***---***	***---***	***---***	***---***	***---***	***---***	***---***
Compactor	2270002009	SC	25	10	***0.00***	***0.00***	***0.00***	***0.005***	***0.00***	***0.00***	***0.00***
Pavement Cutter	2270002039	PC	25	10	***0.15***	***0.00***	***0.00***	***0.005***	***0.00***	***0.00***	***0.00***
Total (tons/year)					**201.22**	**3.87**	**17.14**	**0.07**	**1.02**	**0.77**	**0.75**

1. Emissions using ULSD (Ultra-low Sulfur Diesel) assume 15 ppm S concentration in fuel.

Appendix Table D4
Truck Traffic Emissions on Paved Roads

Table D4: Truck Traffic Emissions on Paved Roads

Anticipated Length of Workday: 7 hours/day
Construction Activity Duration: 12 months **240** days

Paved Roads

Equipment	Equipment ID	Avg. Vehicles/ day	Max. Vehicles / hour	Feet/ vehicle	Activity Duration (hrs)	Estimate Emissions: TSP (lb/hr)	Estimate Emissions: PM_{10} (lb/hr)	Estimate Emissions: PM_{10} (Tons)	Days with >= 0.01" precip., p (days)[2]	Emission Estimates With Natural Mitigation: TSP (lb/hr)	Emission Estimates With Natural Mitigation: PM_{10} (lb/hr)[1]	Emission Estimates With Natural Mitigation: PM_{10} (Tons)
Concrete truck	CT1	10	1	5280	1680	1.991E+03	1.939E+00	7.214E+00	140	***1.953E+03***	***1.902E+00***	***6.522E+00***
Dump truck	DT1	68	1	5280	1680	3.879E+00	4.828E-01	4.906E+01	140	***3.804E+00***	***4.735E-01***	***4.435E+01***
Flatbed truck	FT1	2	1	5280	1680	9.656E-01	9.955E+00	1.443E+00	140	***9.471E-01***	***9.764E+00***	***1.304E+00***
				Total:	5040	1.996E+03	1.238E+01	***5.771E+01***		***1.958E+03***	***1.214E+01***	***5.218E+01***

1. Since the vehicles are expected to travel at speeds less than 5 mi/hr, a 50% control efficiency for PM10 is applied to calculate the emission estimates. PM2.5 is negligible.
2. Number of precipitation days with rainfall amounts measured >= 0.01 in were provided by OEPA/OTA (June 17, 2005 letter)
3. Unpaved Roads: Estimated feet traveled by each vehicle is calculated by the number of loads (10 ft per trip each way) using the amount of material being removed divided by the estimated capacity of the equipment.