Section IV - Emission Unit Information

Process Information

Emission Unit	UBOILR	Process	B05		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10200602					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of natural gas for hot water production.

Emission Point Identifier(s)
00032

Emission Source / Control Identifier(s)
S0032

Emission Unit	UBOILR	Process	B06		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10200502					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of fuel oil for hot water production.

Emission Point Identifier(s)
00032

Emission Source / Control Identifier(s)
S0032

Section IV - Emission Unit Information

Process Information

Emission Unit	UBOILR	Process	B07		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10300701					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of digester gas for hot water production.

Emission Point Identifier(s)
00033

Emission Source / Control Identifier(s)
S0033

Emission Unit	UBOILR	Process	B08		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10200602					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of natural gas for hot water production.

Emission Point Identifier(s)
00033

Emission Source / Control Identifier(s)
S0033

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Process Information

Emission Unit	UBOILR	Process	B09		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10200502					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of fuel oil for hot water production.

Emission Point Identifier(s)
00033

Emission Source / Control Identifier(s)
S0033

Emission Unit	UBOILR	Process	B10		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10300701					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of digester gas for hot water production.

Emission Point Identifier(s)
00034

Emission Source / Control Identifier(s)
S0034

Section IV - Emission Unit Information

Process Information

Emission Unit	UBOILR	Process	B11		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10200602					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of natural gas for hot water production.

Emission Point Identifier(s)
00034

Emission Source / Control Identifier(s)
S0034

Emission Unit	UBOILR	Process	B12		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
10200502					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MNBLDG		

Description

Combustion of fuel oil for hot water production.

Emission Point Identifier(s)
00034

Emission Source / Control Identifier(s)
S0034

Emission Unit Applicable Federal Requirements

Emision Unit	U-BOILR	Emission Point			Process			Emission Source		
Title	Type	Part	Sub Part	Section	Sub Division	Parag	Sub Parag	Clause	Sub Clause	Item
40	CFR	60	A							
40	CFR	60	A	11	d					
40	CFR	60	Dc	40c						
40	CFR	60	Dc	42c	d					
40	CFR	60	Dc	42c	i					
40	CFR	60	Dc	43c	c					
6	NYCRR	227	1	3						

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Emission Unit Description

Emission Unit	UENGIN

The Bay Park STP operates four 3,600 kW (5,030 BHp) engine generators to produce electric power. The engines are manufactured by Cooper-Bessemer (Model LSVB-12-GDT) and were installed in 1989. The engines incorporate CleanBurn® modifications to reduce NOx emissions and catalytic oxidizers to reduce VOC and CO emissions. Catalytic oxidizers are only operated on engines burning natural gas or distillate fuel oil. Each engine is equipped with a dedicated emission point.

Building

Building	Building Name	Length	Width	Orient.
GENBLDG	POWER GENERATION FACILITY BUILDING			

Emission Point

Emission Unit		Emission Pt.	00023			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section Length (in)	Cross Section Width (in)
12	52	15	30			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	GENBLDG		

Emission Unit		Emission Pt.	00024			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section Length (in)	Cross Section Width (in)
12	52	15	30			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	GENBLDG		

Emission Unit		Emission Pt.	00025			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section Length (in)	Cross Section Width (in)
12	52	15	30			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	GENBLDG		

Emission Unit		Emission Pt.	00026			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section Length (in)	Cross Section Width (in)
12	52	15	30			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	GENBLDG		

DEC ID: 1282000652 Application ID: 128200065200055 **Renewal Number: 2**

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Emission Source / Control

Emission Unit		Emission Source	S0023	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
C	01/01/1989			Engine generator manufactured by Cooper-Bessemer (LSVB-12-GDT)
Design Capacity	3600	Units Code	213	Desc kilowatts
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit		Emission Source	S0024	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
C	01/01/1989			Engine generator manufactured by Cooper-Bessemer (LSVB-12-GDT)
Design Capacity	3600	Units Code	213	Desc kilowatts
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit		Emission Source	S0025	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
C	01/01/1989			Engine generator manufactured by Cooper-Bessemer (LSVB-12-GDT)
Design Capacity	3600	Units Code	213	Desc kilowatts
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit		Emission Source	S0026	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
C	01/01/1989			Engine generator manufactured by Cooper-Bessemer (LSVB-12-GDT)
Design Capacity	3600	Units Code	213	Desc kilowatts
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Section IV - Emission Unit Information

Process Information

Emission Unit	UENGIN	Process	E01		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20300702					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of digester gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%. When operating in this mode catalytic oxidizers cannot be used because the control equipment experiences fouling from siloxane which is a component of the digester gas.

Emission Point Identifier(s)
00023

Emission Source / Control Identifier(s)
S0023

Emission Unit	UENGIN	Process	E02		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100202					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of natural gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%

Emission Point Identifier(s)
00023

Emission Source / Control Identifier(s)
S0023

Section IV - Emission Unit Information

Process Information

Emission Unit	UENGIN	Process	E03		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100102					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of distillate fuel oil in engine to produce electricity. This fuel mode is only utilized during fuel switches, testing, preventative maintenance, repairs and emergencies.

Emission Point Identifier(s)
00023

Emission Source / Control Identifier(s)
S0023

Emission Unit	UENGIN	Process	E04		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20300702					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of digester gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%. When operating in this mode catalytic oxidizers cannot be used because the control equipment experiences fouling from siloxane which is a component of the digester gas.

Emission Point Identifier(s)
00024

Emission Source / Control Identifier(s)
S0024

Section IV - Emission Unit Information

Process Information

Emission Unit	UENGIN	Process	E05		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100202					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of natural gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%

Emission Point Identifier(s)
00024

Emission Source / Control Identifier(s)
S0024

Emission Unit	UENGIN	Process	E06		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100102					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of distillate fuel oil in engine to produce electricity. This fuel mode is only utilized during fuel switches, testing, preventative maintenance, repairs and emergencies.

Emission Point Identifier(s)
00024

Emission Source / Control Identifier(s)
S0024

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV.- Emission Unit Information

Process Information

Emission Unit	UENGIN	Process	E07		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20300702					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of digester gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%. When operating in this mode catalytic oxidizers cannot be used because the control equipment experiences fouling from siloxane which is a component of the digester gas.

Emission Point Identifier(s)
00025

Emission Source / Control Identifier(s)
S0025

Emission Unit	UENGIN	Process	E08		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100202					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of natural gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%

Emission Point Identifier(s)
00025

Emission Source / Control Identifier(s)
S0025

Section IV - Emission Unit Information

Process Information

Emission Unit	UENGIN	Process	E09		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100102					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of distillate fuel oil in engine to produce electricity. This fuel mode is only utilized during fuel switches, testing, preventative maintenance, repairs and emergencies.

Emission Point Identifier(s)
00025

Emission Source / Control Identifier(s)
S0025

Emission Unit	UENGIN	Process	E10		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20300702					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of digester gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%. When operating in this mode catalytic oxidizers cannot be used because the control equipment experiences fouling from siloxane which is a component of the digester gas.

Emission Point Identifier(s)
00026

Emission Source / Control Identifier(s)
S0026

Section IV - Emission Unit Information

Process Information

Emission Unit	UENGIN	Process	E11		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100202					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of natural gas in engine to produce electricity. Distillate fuel oil is used as a pilot fuel at a ratio of approximately 1.5%

Emission Point Identifier(s)
00026

Emission Source / Control Identifier(s)
S0026

Emission Unit	UENGIN	Process	E12		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
20100102					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GENBLDG		

Description

Combustion of distillate fuel oil in engine to produce electricity. This fuel mode is only utilized during fuel switches, testing, preventative maintenance, repairs and emergencies.

Emission Point Identifier(s)
00026

Emission Source / Control Identifier(s)
S0026

Emission Unit Applicable Federal Requirements

Emision Unit	U-BOILR	Emission Point			Process			Emission Source		
Title	Type	Part	Sub Part	Section	Sub Division	Parag	Sub Parag	Clause	Sub Clause	Item
6	NYCRR	227	1	3						

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Process Emission Summary

Emission Unit	U-ENGIN	Process	E01					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E02					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E03					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E04					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E05					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E06					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Process Emission Summary

Emission Unit	U-ENGIN	Process	E07					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E08					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E09					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E10					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E11					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

Emission Unit	U-ENGIN	Process	E12					
CAS No.	Contaminant Name			% of Thruput	% of Capture	% of Control	ERP (lb/hr)	ERP How Determined
0NY210-0-0	OXIDES OF NITROGEN						55.73	01
PTE			Standard Units	PTE How Determined		Actual		
(lb/hr)	(lb/yr)	(standard units)				(lb/hr)	(lb/hr)	
55.73	488200	9	319	01				

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Emission Unit Emissions Summary

Emission Unit	U-ENGIN				
CAS No.		Contaminant			
0NY210-0-0		OXIDES OF NITROGEN			
ERP (lb/hr)		PTE (lb/hr)	PTE (lb/yr)	Actual (lb/hr)	Actual (lb/hr)
488200		55.73	488200		

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Emission Unit Description

Emission Unit	USCRUB

The Bay Park STP employs thirteen scrubbers to control odors from the process operations. The scrubbers are all either vertical or horizontal packed-bed wet scrubbers. NaOH and NaOCl are continuously added to neutralize and oxidize the sulfur compounds.

Building

Building	Building Name	Length	Width	Orient.
AERATKOCB	AERATION TANKS ODOR CONTROL BUILDING			
DESLDGFAC	SLUDGE DEWATERING FACILITY BUILDING			
GRITBLD	GRIT BUILDING			
INFBLD	INFLUENT BAR SCREEN FACILITY BUILDING			
MOCFAC	MISCELLANEOUS ODOR CONTROL FACILITY			
PRIMBLD	PRIMARY ODOR CONTROL BUILDING			
THICKENBLD	SLUDGE THICKENING FACILITY BUILDING			

Emission Point

Emission Unit		Emission Pt.	00001			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
10	37	8			144	96
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	THICKENBLD		

Emission Unit		Emission Pt.	00002			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
10	37	8			144	96
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	THICKENBLD		

Emission Unit		Emission Pt.	00003			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
12	36	6	24			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	GRITBLD		

Emission Unit		Emission Pt.	00004			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
12	36	6	24			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	GRITBLD		

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Emission Point

Emission Unit		Emission Pt.	00005			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
10	34	4	22			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	INFBLD		

Emission Unit		Emission Pt.	00019			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
14	23	10	42			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	PRIMBLD		

Emission Unit		Emission Pt.	00020			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
14	23	10	42			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	PRIMBLD		

Emission Unit		Emission Pt.	00021			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
8	43	4			180	72
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	DESLDFAC		

Emission Unit		Emission Pt.	00022			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
8	43	4			180	72
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	DESLDGFAC		

Emission Unit		Emission Pt.	00027			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
10	35	6	24			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	MOCFAC		

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Emission Point

Emission Unit		Emission Pt.	00028			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
9.5	36	9	48			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	AERATKOCB		

Emission Unit		Emission Pt.	00029			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
9.5	36	9	48			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	AERATKOCB		

Emission Unit		Emission Pt.	00030			
Ground Elev (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp (°F)	Cross Section	
					Length (in)	Width (in)
9.5	36	9	48			
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line	Date of Removal
		613.033	4498.723	AERATKOCB		

Emission Source / Control

Emission Unit	USCRUB	Emission Source		00001	
Source Type	Date of Construction	Date of Operation	Date of Removal		Manufacturer's Name/Model Number
K					XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc	
Control Type	Code	001	Desc		WET SCRUBBER
Waste Feed	Code		Desc		
Waste Type	Code		Desc		

Emission Unit	USCRUB	Emission Source		00002	
Source Type	Date of Construction	Date of Operation	Date of Removal		Manufacturer's Name/Model Number
K					XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc	
Control Type	Code	001	Desc		WET SCRUBBER
Waste Feed	Code		Desc		
Waste Type	Code		Desc		

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	00003	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00004	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00005	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00019	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				WESTATES CARBON INC/CEILCOTE CO
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00020	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				WESTATES CARBON INC/CEILCOTE CO
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	00021	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00022	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				XERXES CORP/HEIL PROCESS EQUIP INC
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00027	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				REMEDIAL SYSTEMS INC/CEILCOTE CO
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00028	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				CEILCOTE AIR POLLUTION CONTROL
Design Capacity		Units Code		Desc
Control Type	Code	001	Desc	WET SCRUBBER
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	00029	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				CEILCOTE AIR POLLUTION CONTROL
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	00030	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
K				CEILCOTE AIR POLLUTION CONTROL
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0001	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				SLUDGE THICKENERS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0002	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				GRIT CHAMBERS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0003	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				INFLUENT SCREENING CHANNELS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0004	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				INFLUENT GATE CHAMBERS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	S0005	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				PRIMARY SETTLING TANKS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0006	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				BELT FILTER PRESSES
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0007	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FST INFLUENT CHANNEL
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0008	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				RAS LIFTS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0009	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				RAS WET WELL
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	S0010	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				AERATION TANK #1
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0011	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				AERATION TANK #2
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0012	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				AERATION TANK #3
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0013	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				AERATION TANK #4
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0014	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #1
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	S0015	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #2
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0016	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #3
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0017	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #4
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0018	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #5
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0019	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #6
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	S0020	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #7
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0021	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #8
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0022	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #9
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0035	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL EFFLUENT SCREENING CHANNEL
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0036	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				AERATION TANKS' INFLUENT AND EFFLUENT CHANNELS
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

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Emission Source / Control

Emission Unit	USCRUB	Emission Source	S0037	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				FINAL SEDIMENTATION TANK #10
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Emission Unit	USCRUB	Emission Source	S0038	
Source Type	Date of Construction	Date of Operation	Date of Removal	Manufacturer's Name/Model Number
I				AERATION TANK #5
Design Capacity		Units Code		Desc
Control Type	Code		Desc	
Waste Feed	Code		Desc	
Waste Type	Code		Desc	

Process Information

Emission Unit	USCRUB	Process	P01		
Source Classification Code (SCC)	Total Thruput			Thruput Quantity Units	
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential		Operating Schedule		Building	Floor / Location
☐ Operating at Maximum Capacity		Hrs / Day	Days / Yr		
☐ Activity w/ Insignificant Emission				THICKENBLD	

Description

The sludge thickeners are used in the sludge thickening process. Two scrubbers are used for this process and are vented to the same emission point.

Emission Point Identifier(s)	
00001	00002

Emission Source / Control Identifier(s)		
00001	00002	S0001

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P02		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			GRITBLD		

Description

The grit chambers are used in the grit removal process. Two scrubbers are used for this process.

Emission Point Identifier(s)	
00003	00004

Emission Source / Control Identifier(s)		
00003	00004	S0002

Emission Unit	USCRUB	Process	P03		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			INFBLD		

Description

The influent screening channels and the influent gate chamber are part of the screening process. One scrubber is used for this process.

Emission Point Identifier(s)
00005

Emission Source / Control Identifier(s)		
00005	S0003	S0004

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Process Information

Emission Unit	USCRUB	Process	P04		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			PRIMBLD		

Description

The primary settling tanks are used in the primary sedimentation process. Two scrubbers are used for this process.

Emission Point Identifier(s)	
00019	00020

Emission Source / Control Identifier(s)		
00019	00020	S0005

Emission Unit	USCRUB	Process	P05		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			DESLDGFAC		

Description

The belt filter presses are used in the sludge dewatering process. Two scrubbers are used for this process.

Emission Point Identifier(s)	
00021	00022

Emission Source / Control Identifier(s)		
00021	00022	S0006

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Process Information

Emission Unit	USCRUB	Process	P06		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			MOCFAC		

Description

The aeration process includes the following odor controlled areas: FST Influent Channel; RAS lifts; and, RAS Wet Well, which are treated by Scrubber 00027.

Emission Point Identifier(s)
00027

Emission Source / Control Identifier(s)			
00027	S0007	S0008	S0009

Emission Unit	USCRUB	Process	P07		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Aeration Tank No. 1 is part of the aeration process and is covered to mitigate odor issues. All process air is vented to odor control scrubbers.

Emission Point Identifier(s)		
00028	00029	00030

Emission Source / Control Identifier(s)			
00028	00029	00030	S0010

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Process Information

Emission Unit	USCRUB	Process	P08		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Aeration Tank No. 2 is part of the aeration process and is covered to mitigate odor issues. All process air is vented to odor control scrubbers.

Emission Point Identifier(s)			
00028	00029	00030	

Emission Source / Control Identifier(s)			
00028	00029	00030	S0011

Emission Unit	USCRUB	Process	P07		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Aeration Tank No. 3 is part of the aeration process and is covered to mitigate odor issues. All process air is vented to odor control scrubbers.

Emission Point Identifier(s)			
00028	00029	00030	

Emission Source / Control Identifier(s)			
00028	00029	00030	S0012

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P10		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Aeration Tank No. 4 is part of the aeration process and is covered to mitigate odor issues. All process air is vented to odor control scrubbers.

Emission Point Identifier(s)

00028	00029	00030

Emission Source / Control Identifier(s)

00028	00029	00030	S0013

Emission Unit	USCRUB	Process	P11		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission			AERATKOCB		

Description

The following are covered area sources and are part of the aeration process: Aeration Tank Influent and Effluent Channels

Emission Point Identifier(s)

00028	00029	00030

Emission Source / Control Identifier(s)

00028	00029	00030	S0036

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P12		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 1 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0014

Emission Unit	USCRUB	Process	P13		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 2 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0015

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P14		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 3 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0016

Emission Unit	USCRUB	Process	P15		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 4 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0017

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P16		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 5 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0018

Emission Unit	USCRUB	Process	P17		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 6 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0019

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P18		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 7 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0020

Emission Unit	USCRUB	Process	P19		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 8 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0021

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P20		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 9 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0022

Emission Unit	USCRUB	Process	P21		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Final Sedimentation Tank No. 10 is part of the secondary sedimentation process and is an open source.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0037

DEC ID: 1282000652 Application ID: 128200065200055 Renewal Number: 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

Section IV - Emission Unit Information

Process Information

Emission Unit	USCRUB	Process	P22		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

The final effluent screening channel is an open source which is covered but not odor controlled. It is included in the secondary process.

Emission Point Identifier(s)
Emission Source / Control Identifier(s)
S0035

Emission Unit	USCRUB	Process	P23		
Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units		
	Quantity / Hr	Quantity / Yr	Code	Description	
30182002					
☐ Confidential	Operating Schedule		Building	Floor / Location	
☐ Operating at Maximum Capacity	Hrs / Day	Days / Yr			
☐ Activity w/ Insignificant Emission					

Description

Aeration Tank No. 5 is part of the aeration process and is covered to mitigate odor issues. All process air is vented to odor control scrubbers.

Emission Point Identifier(s)		
00028	00029	00030

Emission Source / Control Identifier(s)			
00028	00029	00030	S0038

DEC ID: 1282000652 **Application ID:** 128200065200055 **Renewal Number:** 2

Facility: Nassau County; Bay Park Sewage Treatment Plant

1

Supporting Documentation

Document Description
Methods used to determine compliance

ATTACHMENT 1

P.E. CERTIFICATION

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
1-2820-00652

P.E. Certification

I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments as they pertain to the practice of engineering. This is defined as the performance of a professional service such as consultation, investigation, evaluation, planning, design or supervision of construction or operation in connection with any utilities, structures, buildings, machines, equipment, processes, works, or projects wherein the safeguarding of life, health and property is concerned, when such service or work requires the application of engineering principals and data. Based on my inquiry of those individuals with primary responsibility for obtaining such information, I certify that the statements and information are to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Name of P.E.	**Joseph L. Davenport**
Signature of P.E.	
Date	5/6/11
NYS License No.	**069533**
Phone	**(516) 571-7515**

ATTACHMENT 2

LIST OF EXEMPT ACTIVITIES

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
1-2820-00652

List of Exempt Activities (from NYCRR Part 201)

Instructions for Completing Table

Applicants for Title V permits are required to provide a list of exempt activities in the application form. This includes all process or production units and other emission generating activities which are considered exempt as defined by 6 NYCRR Part 301-3.2. Completion of this table fulfills that requirement.

To complete the table, provide the following information for each exempt activity that occurs at the facility defined by this application:

a. The approximate number of each listed activity, and,

b. For location of the activity enter the building ID(s) used in the main application form. Use the building name if a building ID(s) has not been assigned.

If a listed activity does not occur at the facility, leave blank.

Rule Citation 201-3.2(c)	Description	No. of Activities (approx.)	Building Location
Combustion			
(1)	stationary or portable combustion installations where the furnace has a maximum rated heat input capacity <l0 mmBtu/hr burning fossil fuels, other than coal, and coal and wood fired stationary combustion units with a maximum heat input <1 mmBtu/hr. - this includes unit space heaters, which burn waste oils as defined in 6 NYCRR Part 225-2 and generated on-site, alone or in conjunction with used oil generated by a do-it-yourself oil changer as defined in 6 NYCRR Subpart 374-2		
(2)	stationary or portable combustion installations located outside of any severe ozone non-attainment areas, where the furnace has a maximum rated heat input capacity <20 mmBtu/hr burning fossil fuels other than coal, where the construction of the combustion installation commenced before 6/8/89		
(3)(i)	diesel or natural gas powered stationary or portable internal combustion (IC) engines within any severe ozone non-attainment area having a maximum mechanical power rating <225bhp	8	
(3)(ii)	diesel or natural gas powered stationary or portable IC engines located outside of any severe ozone non-attainment areas having a maximum mechanical power rating <400 bhp		
(3)(iii)	gasoline powered IC engines having a maximum mechanical power rating <50bhp	3	Plant Maintenance
(4)	stationary or portable IC engines which are temporarily located at a facility for a period ≤30 days/calendar year, where the total combined maximum mechanical power rating for all affected units is <1000bhp		
(5)	gas turbines with a heat input at peak load <10 mmBtu/hr		
(6)	emergency power generating units installed f or use when the usual sources of heat, power, water and lighting are temporarily unobtainable, or which are installed to provide power <500 hrs/yr and excluding those units under contract with a utility to provide peak shaving generation to the grid	3	Operations
Combustion-Related			
(7)	non-contact water cooling towers and water treatment systems for process cooling water and other water containers designed to cool, store or otherwise handle water that has not been in direct contact with gaseous or liquid process streams		

New York State Department of Environmental Conservation
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List of Exempt Activities (from NYCRR Part 201)

Rule Citation 201-3.2(c)	Description	No. of Activities (approx.)	Building Location
Combustion			
(8)	feed and grain milling, cleaning, conveying, drying and storage operations including grain storage silos, where such silos exhaust to an appropriate emission control device, excluding grain terminal elevators with permanent storage capacities over 2.5 million US bushels, and grain storage elevators with capacities above 1 million bushels		
(9)	equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators and electrical power generating equipment		
Commerical-Food Service Industries			
(10)	flour silos at bakeries, provided all such silos are exhausted through an appropriate emission control device		
(11)	emissions from flavorings, added to a food product where such flavors are manually added to the product		
Commerical-Graphic Arts			
(12)	screen printing inks/coatings or adhesives which are applied by a hand-held squeegee (i.e.one that is not propelled thru the use of mechanical conveyance and is not an integral part of the screen printing process)		
(13)	graphic arts processes at facilities located outside the NYC metropolitan area whose facility-wide total emissions or VOC's from inks, coatings, adhesives, fountain solutions and cleaning solutions does not exceed 20 lbs/day		
(14)	graphic label and/or box labeling operations where the inks are applied by stamping or rolling		
(15)	graphic arts processes which are specifically exempted from regulation under Part 234 with regard to emissions of VOC's which are not given an A rating		
Commerical-Other			
(16)	gasoline dispensing sites with an annual thruput <120,000 gal located outside any severe non-attainment areas		
(17)	surface coating related operations which use less than 25 gal/mo of coating materials (paints) and cleaning solvents, combined, subject to the following: - the facility is located outside of severe ozone non-attainment area - all abrasive cleaning and surface coating operations are performed in an enclosed building where such operations are ex hausted into appropriate emission control devices		
(18)	abrasive cleaning operations which exhaust to an appropriate emission control device		
(19)	ultraviolet curing operations		
Municipal/Public Health Related			
(20)	ventilating systems for landfill gases, where the systems are vented directly to the atmosphere, and the ventilating system has been required by, and is operatingunder, the conditions of a valid Part 360 permit, or Order on Consent		

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
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List of Exempt Activities (from NYCRR Part 201)

Rule Citation 201-3.2(c)	Description	No. of Activities (approx.)	Building Location
Combustion			
(8)	feed and grain milling, cleaning, conveying, drying and storage operations including grain storage silos, where such silos exhaust to an appropriate emission control device, excluding grain terminal elevators with permanent storage capacities over 2.5 million US bushels, and grain storage elevators with capacities above 1 million bushels		
(9)	equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators and electrical power generating equipment		
Commerical-Food Service Industries			
(10)	flour silos at bakeries, provided all such silos are exhausted through an appropriate emission control device		
(11)	emissions from flavorings, added to a food product where such flavors are manually added to the product		
Commerical-Graphic Arts			
(12)	screen printing inks/coatings or adhesives which are applied by a hand-held squeegee (i.e.one that is not propelled thru the use of mechanical conveyance and is not an integral part of the screen printing process)		
(13)	graphic arts processes at facilities located outside the NYC metropolitan area whose facility-wide total emissions or VOC's from inks, coatings, adhesives, fountain solutions and cleaning solutions does not exceed 20 lbs/day		
(14)	graphic label and/or box labeling operations where the inks are applied by stamping or rolling		
(15)	graphic arts processes which are specifically exempted from regulation under Part 234 with regard to emissions of VOC's which are not given an A rating		
Commerical-Other			
(16)	gasoline dispensing sites with an annual thruput <120,000 gal located outside any severe non-attainment areas		
(17)	surface coating related operations which use less than 25 gal/mo of coating materials (paints) and cleaning solvents, combined, subject to the following: - the facility is located outside of severe ozone non-attainment area - all abrasive cleaning and surface coating operations are performed in an enclosed building where such operations are ex hausted into appropriate emission control devices		
(18)	abrasive cleaning operations which exhaust to an appropriate emission control device		
(19)	ultraviolet curing operations		
Municipal/Public Health Related			
(20)	ventilating systems for landfill gases, where the systems are vented directly to the atmosphere, and the ventilating system has been required by, and is operatingunder, the conditions of a valid Part 360 permit, or Order on Consent		

New York State Department of Environmental Conservation
Air Permit Application

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List of Exempt Activities (from NYCRR Part 201)

Storage Vessels			
Rule Citation 201-3.2(c)	Description	No. of Activities (approx.)	Building Location
(21)	distillate and residual fuel oil storage tanks with storage capacities <300,000 bbls	20	Plant-wide
(22)	pressurized fixed roof tanks which are capable of maintaining a working pressure at all times to prevent emissions of VOC's to the outdoor atmosphere		
(23)	external floating roof tanks which are of welded construction and are equipped with a metallic-type shoe primary seal and a secondary seal from the top of the shoe seal to the tank wall		
(24)(i)	external floating roof tanks which are used for the storage of a petroleum or volatile organic liquid with a true vapor pressure <4.0 psi (27.6 kPa), are of welded construction and are equipped with a *metallic-type shoe seal*		
(24)(ii)	external floating roof tanks which are used for the storage of a petroleum or volatile organic liquid with a true vapor pressure <4.0 psi (27.6 kPa), are of welded construction and are equipped with a *liquid-mounted foam seal*		
(24)(iii)	external floating roof tanks which are used for the storage of a petroleum or volatile organic liquid with a true vapor pressure <4.0 psi (27.6 kPa), are of welded construction and are equipped with a *liquid-mounted liquid-filled type seal*		
(24)(iv)	external floating roof tanks which are used for the storage of a petroleum or volatile organic liquid with a true vapor pressure <4.0 psi (27.6 kPa), are of welded construction and are equipped with a *control equipment or device equivalent to those previously listed in items (24) (i) thru (iii)*		
(25)	storage tanks, with capacities <10,000 gal, except those subject to either Part 229 or Part 233	25	Plant-wide
(26)	horizontal petroleum storage tanks		
(27)	storage silos storing solid materials, provided all such soils are exhausted thru an appropriate emission control device		
Industrial			
(28)	processing equipment at existing sand and gravel and stone crushing plants which were installed or constructed before 8/31/83, where water is used other than for dust suppression, such as wet conveying, separating and washing		
(29)(i)	all processing equipment at sand and gravel mines or quarries that *permanent or fixed installations with a maximum rated processing capacity ≤25 tph of minerals*		
(29)(ii)	all processing equipment at sand and gravel mines or quarries that *mobile (portable) installations with a maximum rated processing capacity ≤150 tph of minerals*		
(30)	mobile (portable) stone crushers with maximum rated capacities ≤150 tph of minerals which are located at nonmetallic mineral processing operations		
(31)	surface coating operations which are specifically exempted from regulation under Part 228, with regard to emissions of VOC's Which are not given an A rating		
(32)	pharmaceutical tablet branding operations		
(33)	thermal packaging operations, including but not limited to, therimage labeling, blister packing, shrink wrapping, shrink banding, and carton		

ATTACHMENT 3

METHOD OF COMPLIANCE FORM

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
1-2820-00652

METHODS USED TO DETERMINE COMPLIANCE

Emission Unit ID	Applicable Requirements	Method Used to Determine Compliance and Corresponding Date
U-ENGIN	6 NYCRR Part 227-2.4(f)(2)(ii)	The Bay Park STP will use a system averaging plan in accordance with 6 NYCRR Part 227-2.5(b) to meet the presumptive RACT limits outlined by 6 NYCRR Part 2.4(f). An average hourly NOx emission rate will be calaculated on a monthly basis utilizing the calculation method outlined in the attached calculation sheets. The Bay Park STP will ensure that the NOx emission rate from the four engines will not exceed the applicable emission limit.

Nassau County Department of Public Works
Bay Park Sewage Treatment Plant
Title V Permit Emissions **Engine Emissions of NOx, CO and NMHC**

Power Generation

kWh/month:	3,441,600
Hours of EG operation/month:	1,445
kW per EG:	2,382

Fuel Usage

Natural Gas [scf]:	31,008,000
Digester Gas [scf]:	7,667,000
Total No. 2 Fuel Oil [gals]:	7,975
No. 2 Fuel Oil_{Pilot} [gals]:	3,698
No. 2 Fuel Oil_{Mode} [gals]:	4,277

Fuel Usage Rates [BTU/kWh]

Natural Gas:	9,434
Digester Gas:	9,487
No. 2 Fuel Oil:	8,962

Fuel Heating Values

Natural Gas [BTU/scf]:	931
Digester Gas [BTU/scf]:	561
No. 2 Fuel Oil [BTU/gal]:	129,058

Engine-Generators

	No. 1	No. 2	No. 3	No. 4	Total
Total Hours of Operation:	505	86	217	637	1,445
Natural Gas Mode [hrs]:	500	64	215	471	1,249
Digester Gas Mode [hrs]:	0	20	0	153	173
No. 2 Fuel Oil Mode [hrs]:	5	2	2	13	22

Engine Emissions

	No. 1	No. 2	No. 3	No. 4	Total
Natural Gas Mode					
$NOx_{NG\ Mode}$ [lbs/hr]	5.42	5.42	5.42	5.42	
$NOx_{NG\ Mode}$ [lbs]	2,707	345	1,164	2,552	6,768
Digester Gas Mode					
$NOx_{DG\ Mode}$ [lbs/hr]	3.01	3.01	3.01	3.01	
$NOx_{DG\ Mode}$ [lbs]	0	60	0	461	521
No. 2 Fuel Oil Mode					
$NOx_{DG\ Mode}$ [lbs/hr]	75.07	75.07	75.07	75.07	
$NOx_{DG\ Mode}$ [lbs]	390	133	168	986	1,677
Total NOx Emissions [lbs]:	3,098	538	1,332	3,998	8,966

Nassau County Department of Public Works
Bay Park Sewage Treatment Plant
Title V Permit Emissions **Engine Emissions of NOx, CO and NMHC**

Natural Gas Mode					
$CO_{NG\ Mode}$ [lbs/hr]	1.01	21.47	1.01	21.47	
$CO_{NG\ Mode}$ [lbs]	504	1,365	217	10,109	12,195
Digester Gas Mode					
$CO_{DG\ Mode}$ [lbs/hr]		21.85		21.85	
$CO_{DG\ Mode}$ [lbs]		437		3,344	3,781
No. 2 Fuel Oil Mode					
$CO_{DG\ Mode}$ [lbs/hr]	0.06	2.09	0.06	2.09	
$CO_{DG\ Mode}$ [lbs]	0	4	0	27	32
Total CO Emissions [lbs]:	505	1,805	217	13,480	16,007
Natural Gas Mode					
$NMHC_{NG\ Mode}$ [lbs/hr]	2.18	3.79	2.18	3.79	
$NMHC_{NG\ Mode}$ [lbs]	1,089	241	468	1,784	3,582
Digester Gas Mode					
$NMHC_{DG\ Mode}$ [lbs/hr]		0.83		0.83	
$NMHC_{DG\ Mode}$ [lbs]		17		127	144
No. 2 Fuel Oil Mode					
$NMHC_{DG\ Mode}$ [lbs/hr]	0.11	0.45	0.11	0.45	
$NMHC_{DG\ Mode}$ [lbs]	1	1	0	6	8
Total NMHC Emissions [lbs]:	1,089	258	468	1,917	3,734

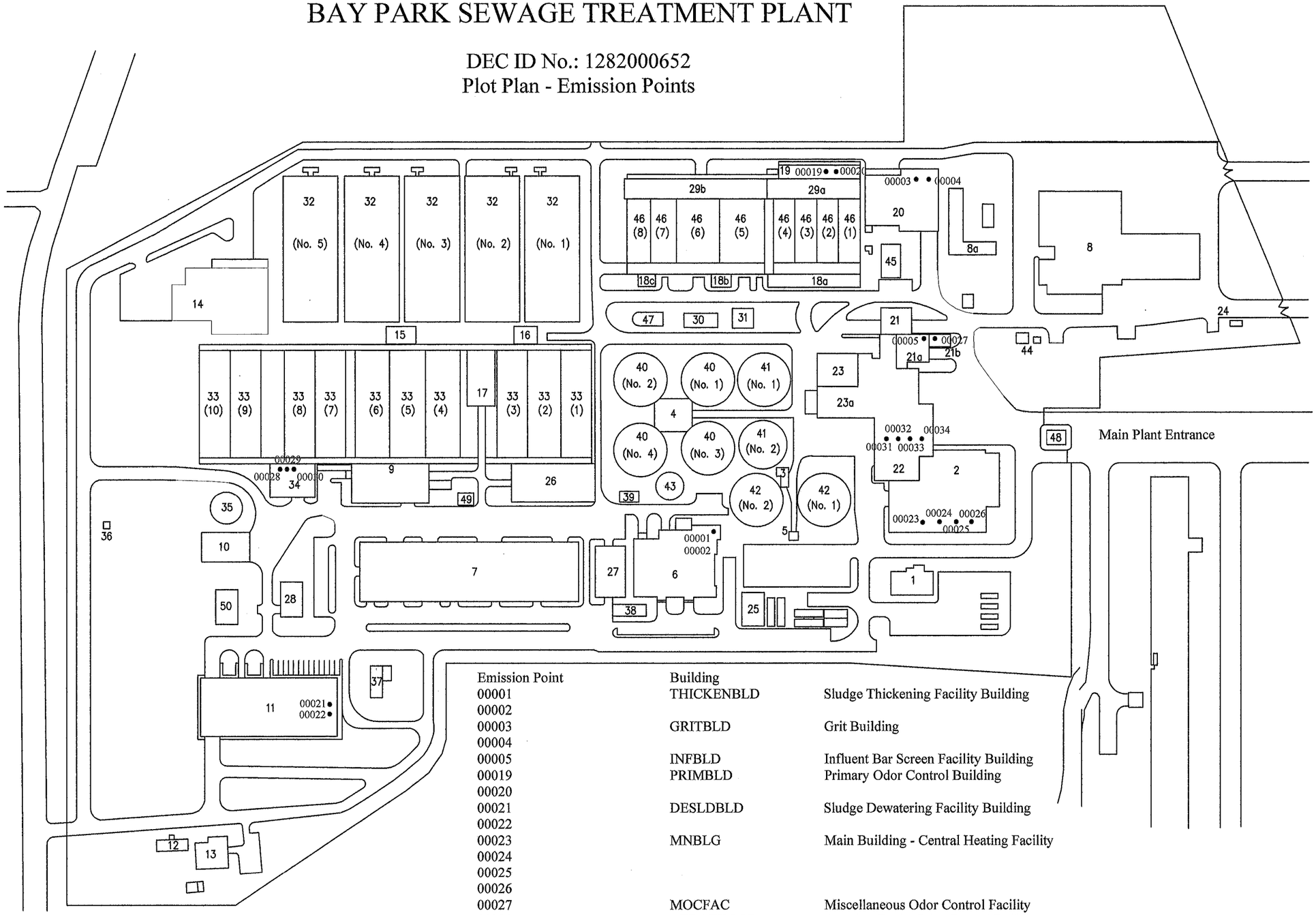
Total Emissions - All Fuels	NOx Emissions	CO Emissions	NMHC Emissions
[lbs]	8,966	16,007	3,734
[tons]	4.48	8.00	1.87
Total Emission Rate - All Fuels			
[grams/BHp-Hr]	0.849	1.515	0.353

ATTACHMENT 4

BAY PARK STP – EMISSION POINTS – PLOT PLAN

BAY PARK SEWAGE TREATMENT PLANT

DEC ID No.: 1282000652
Plot Plan - Emission Points



Emission Point	Building	
00001	THICKENBLD	Sludge Thickening Facility Building
00002		
00003	GRITBLD	Grit Building
00004		
00005	INFBLD	Influent Bar Screen Facility Building
00019	PRIMBLD	Primary Odor Control Building
00020		
00021	DESLDBLD	Sludge Dewatering Facility Building
00022		
00023	MNBLG	Main Building - Central Heating Facility
00024		
00025		
00026		
00027	MOCFAC	Miscellaneous Odor Control Facility
00028	AERATKOCB	Aeration Tanks Odor Control Building
00029		
00030		
00031	GENBLG	Power Generation Facility Building
00032		
00033		
00034		

Buildings and Structures

1. NCDPW Testing Laboratory
2. Power Generation Facility
3. Sludge Pump Control Center
4. Sludge Control Building
5. Tunnel Access Structure
6. Sludge Thickening Facility
7. Plant Maintenance Building
8. Sewer Maintenance Building

8a. Sewer Maintenance Storage Building

9. Effluent Screening and Disinfection Building
10. Fire Protection Building
11. Sludge Dewatering Facility
12. Unit Substation No. 3
13. Effluent Pumping Facility
14. Operations Building
15. Aeration Building No. 2
16. Aeration Building No. 1
17. Return Activated Sludge Building

18a. Primary Pump Station No. 1
18b. Primary Pump Station No. 2
18c. Primary Pump Station No. 3

19. Primary Odor Control Building
20. Grit Building
21. Scavenger Waste/Septage Receiving Facility

21a. Bar Screen Facility
21b. Miscellaneous Odor Control Facility

22. Main Building - Central Heating Facility
23. Main Building - Personnel Area

23a. Main Building - Plant Administrative Offices

24. Fourth Avenue Gatehouse
25. Construction Administration Building
26. West Central Warehouse
27. East Central Warehouse
28. Dechlorination Facility

29a. Primary Effluent Building (PSTs 1 - 4)
29b. Primary Effluent Building (PSTs 5 - 8)

30. West Interim Heating Facility
31. Primary Influent Distribution Structure
32. Aeration Tanks (Nos. 1 - 5)
33. Final Settling Tanks (Nos. 1 - 10)
34. Aeration Tanks Odor Control Building
35. Fire Protection Water Storage Tank
36. Potable Water Meter House
37. SSDF Interim Heating Facility
38. Unit Substation No. 6
39. Sludge Digestion System MCC Building
40. Primary Sludge Digesters (Nos. 1 - 4)
41. Secondary Sludge Digesters (Nos. 1 - 2)
42. Sludge Storage Tanks (Nos. 1 - 2)
43. Digester Gas Storage Sphere
44. Electrical Sub-Station
45. Unit Substation No. 5
46. Primary Settling Tanks (Nos. 1 - 8)
47. Waste Gas Burner Structure
48. Fifth Avenue Gatehouse
49. Propane Storage Area
50. Cold Storage Building

Appendix Document K
8-Step Review

Nassau County, Bay Park Waste Water Treatment Plant
PW 3714, Alternative Project
FEMA 4085-DR-NY

Executive Order 11988 - FLOODPLAIN MANAGEMENT
Executive Order 11990 - WETLAND PROTECTION

8-STEP PROCESS CHECKLIST

Project: Nassau County, the applicant, seeks Federal Emergency Management Agency (FEMA, the Agency) Public Assistance federal grant funds to restore hurricane damaged facilities, buildings, and appurtenances throughout the area serviced under their authority.

The Department of Homeland Security-Federal Emergency Management Agency (FEMA) is proposing to contribute federal funding from its Public Assistance Program under Section 428 of the Stafford Act to assist Nassau County in restoring function and mitigating future damages to the Bay Park Waste Water Treatment Plant.

The following proposed alternate projects are being included for review and consideration.

1. Flood Berm, Bay Park Wastewater Plant

Construction of a plant boundary surrounding the Bay Park STP to mitigate against future flood events will be done. The boundary will protect up to a 500-year flood elevation which corresponds to an estimated elevation of 17.1-ft NAVD88 or 18.3-ft NGVD 29 (where NGVD 29 is equivalent to the Nassau County Datum). (Note: Final elevations should be coordinated with the local floodplain administrator). The boundary will be part berm and part floodwall. Berms will cover a majority of the East and West sides of the Plant while a T-wall will comprise parts of the North and South boundaries. The boundary includes a slurry wall to stop infiltration of groundwater into the Plant. One main entrance gate and guardhouse is included at the North end of the Plant on Marjorie Lane, and two additional gates are included on the South side of the Plant.

The proposed contract also includes the rehabilitation of the park adjacent to the East side of the Plant, as the proposed berm footprint will displace current park elements. The Park includes a baseball field, tennis courts, restroom facilities, and other essentials elements.

The project will require importation of fill for the berm (10,000 CY) and park improvements (45,000 CY). The 45,000 CY of fill for park improvements would raise park by two (2) ft but it will not change the water surface elevation and

would cause negligible change to storm surge redistribution. The berm will have a clay core support.

2. Dewatering Improvements, Bay Park Wastewater Plant

- Installation of four new dewatering centrifuges with a new wash water system
- Replacement of the sludge feed system
- Replacement of the polymer system (except the polymer tanks)
- Resizing and replacement of the service air system
- Modification of the dewatered sludge cake conveying and unloading system
- Installation of two new free standing bridge cranes
- Modification of the odor control system
- Relocation of the electrical room from the first to the second floor
- Relocation of major heating, ventilation and air conditioning (HVAC) equipment from the first to the second floor
- Update fire protection system per codes and standards
- Structural modifications to the building

3. Electrical Improvements- Phase 1, Bay Park Wastewater Plant

Construction of three (3) new unit substations and install associated electrical equipment at the Bay Park STP based on the current Bid Document. The unit substations will have first floor elevations at or above the 500-yr flood elevation in order to mitigate all electrical equipment. Below are the proposed locations of the new unit substations.

- USS 3 will be located near the Effluent Pumping Facility. A new structure will replace the existing structure.
- USS 4 will be relocated near the Sludge Thickening Facility (Building 6), to replace the existing USS 4 and USS6.
- USS 5 will be located near the Grit Building.

Significant architectural consideration has been given to the unit substation structures in order to provide for efficient ventilation and sustainability.

4. Final Settling Tanks Rehabilitation, Bay Park Wastewater Plant

Construction has begun on the repair contract for the Final Settling Tanks at the Bay Park STP as they were extensively damaged during Hurricane Sandy. The principal work under this contract consists of demolition, removal, and installation of new or in-kind longitudinal and cross collection systems in all final settling tanks. This includes repair or replacement of all chain and flights, drives, guide rails, sprockets, scum piping, electrical and instrumentation and controls.

5. Grit Removal Facility Improvements, Bay Park Wastewater Plant

Work under this contract includes demolition and installation of new equipment per contract documents. Demolition work includes items such as grit tanks, grit collectors and conveyors and auxiliary equipment. Installation of new equipment includes vortex grit removal systems, a new odor control scrubber and HVAC improvements. Other improvements include electrical and building rehabilitation.

6. Sludge Thickening Facility Improvements, Bay Park Wastewater Treatment Plant

The principal features of the work to be performed under this contract consists of demolition and removal of piping and valves, pumps, pressure vessels, concrete demolition, and control panels associated with the abandoned Dissolved Air Flotation Thickeners located in the Sludge Thickening Building. New work will be code compliant and will include:

- Installation of a storage and polymer feeding system, including RFP tanks, mixing pumps, etc. to service four new Gravity Belt Thickeners currently in operation.
- Removal and replacement of the WAS booster pumps with VFDs
- Removal and replacement of screened effluent water pumps
- Architectural improvements to building
- Retrofitting existing DAF tanks to accommodate new equipment and systems
- New carbon absorber odor control system

Additionally, all Public Assistance grant funded projects carried out in the floodplain or affecting the floodplain must be coordinated with the local floodplain administrator for a floodplain development permit and the action must be undertaken in compliance with relevant, applicable and required local codes and standards and thereby, will reduce the risk of future flood loss, minimize the impacts of floods on safety, health, and welfare, and preserve and possibly restore beneficial floodplain values as required by Executive Order 11988.

Restoration projects conducted with Public Assistance grant funds must be carried out in accordance with the local floodplain management plan and ordinance and shall utilize the current Flood Insurance Rate Maps and the National Flood Hazard Layers as the “best available data” as a minimum standard. Exceptions to this requirement shall be reported to the NYSDHSES, FEMA Environmental, and the local floodplain manager before undertaking the action.

STEP 1 **Determine whether the proposed actions are located in a wetland and/or the 100-year floodplain (500-year floodplain for critical actions [44 CFR 9.4]), or whether they have the potential to affect or be affected by a floodplain or a wetland (see 44 CFR 9.7).**

The projects are located in relation to floodplains as mapped by:

Bay Park Waste Water Treatment Plant, East Rockaway, Nassau, NY
Flood Insurance Rate Map Panel # 36059C0218G
Special Flood Hazard Area Zone AE Base Flood Elevation 9-10
Latitude 40.631895° Longitude -73.663959°

The site is located predominantly within the 100-year floodplain (AE Zone 9-10 feet (NAVD88)) as shown on Flood Insurance Rate Map panel # 36053C0218G. The 500-year flood level at the site ranges 13-15 feet.

Repair and modifications to this facility would be a critical action and alternatives are reviewed against the 500-year floodplain in below steps.

Note: A review of the U.S. Fish and Wildlife National Wetland Inventory 5/28/2014 indicates the proposed project locations are not located in a mapped wetland or U.S. waters and will not likely adversely affect wetlands.

There are wetlands adjacent to project site and best management practices will need to be in place to prevent pollution run off from entering wetlands during and post construction.

STEP 2 **Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision making process (see 44 CFR 9.8).**

Applicable - Notice will be or has been provided by:

A Cumulative Initial Public Notice was published New York Post 12/14/2012. The project specific notice is incorporated into the Notice of Availability for the Environmental Assessment.

STEP 3 **Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions and the "no action" option) [see 44 CFR 9.9]. If a practicable alternative exists outside**

the floodplain or wetland, FEMA must locate the action at the alternative site.

Applicable - Alternative identified in the EA Document and is described below:

- **Alternative 1:** No Action – No action would leave the community without the function of the damaged waste water treatment plant. Additionally, this would leave the damaged facilities and their environs in an unsafe condition, which would represent a safety hazard to the public and nearby properties. This alternative will also leave plant suseptable to future flooding events degrading surround environs in the process.

- **Alternative 2: Proposed Action –** The proposed flood mitigation alternative for the Bay Park STP includes the construction of a combination earthen berm and concrete floodwall structure around the perimeter of the plant as the primary defense against flooding. The total length of the floodwall would be approximately 6,700 linear feet and the total length of the earthen berm would be approximately 1,800 linear feet. The concrete floodwall and earthen berm would have a estimated top elevation of approximately +17 feet North American Vertical Datum of 1988 (NAVD88), an elevation above the 500-year floodplain elevation. The recommended design elevation is based on a combination of stillwater flood elevation, wave height and sea level rise. The design elevation also includes a safety factor (freeboard) of two (2) feet. The existing grade elevation at the facility ranges from a low of +6 feet to +16 feet NAVD88. The floodwall and berm on average would be approximately +10 feet in height above existing grade. The construction duration for the proposed project would be from 12-24 months.

  The barrier alignment would include two closure gates, on the north and south sides, which would be closed and sealed during flooding events. The floodwall would be constructed with 18 inch and 24 inch diameter auger cast piles, a vibratory slurry wall and footings. The vibratory slurry wall would be a minimum of 4” thick and the depth of the structure would be -25 feet (NAVD 88). The slurry wall would be composed of material that would set similar to stiff clay. The vertical slurry wall would be installed per the Vibrated Beam Method. The Vibrated Beam Method utilizes a crane with a specially fabricated wide flange beam connected to a large vibratory hammer. The vibratory hammer enables the vibrated beam to penetrate the subsoils. Slurry is injected at the base of the vibrated beam. Installation of the slurry wall would occur as per Specification Beneath utilities, jet grouting would be used in lieu of slurry wall. The fill estimated for construction of the berm would be approximately 10,000 cubic yards and the berm would have a clay core.

Two new pumping stations would be installed to ensure stormwater would continue to flow off-site during storm events. Stormwater drainage would be improved by routed through sub-surface infiltration chambers and then to detention ponds, allowing for sediment removal and groundwater recharge that does not exist under current conditions. The proposed adjustments to the existing stormwater system within the plant would match existing flow capacity or increase it in some instances. In the proposed design, hydraulic efficiency would be increased by the re-sizing or enlarging of some pipe runs and splitting of systems with added catch basins. Under a 1% flood condition or other high water event causing a tidal surge, backflow into the plant would be prevented by way of automatic rubber duckbill valves with secondary redundant sluice gates upstream of those valves. Outflow in the extreme high water scenario would be achieved by use of the two new pumping stations.

The guardhouse would be moved to within the berm and renovated. Construction of the perimeter flood protection structure included in this proposed alternative would impact the adjacent county-owned park to the east and west of the Bay Park STP, which is utilized by the public for recreation. As such, improvements to the park have been included in the scope of work for this alternative. The park improvements include the elevation of the park in its entirety to provide self-drained fields. The park grades would be raised by two (2) feet with 45,000 CY of fill. The construction of the perimeter flood protection structure would also impact nearby Marjorie Lane. As a result, the relocation of this road has been included in the scope of work for this alternative. The roadway would be relocated further inland from the waterway. The realignment of Marjorie Lane, from its present location along the eastern bulkhead to the west along the foot of the perimeter floodwall and berm will allow for the addition of an esplanade along East Rockaway Channel.

- **Alternative 3: Mitigating Indivdual Items –** This flood mitigation alternative consists of protecting the critical systems and structures within the plant individually by either constructing a floodwall up to the 500-year flood elevation (plus freeboard and sea level rise) around each structure or elevating critical equipment (e.g. electrical equipment) to an elevation greater than the 500-year floodplain elevation. All systems and equipment at the Bay Park STP are tiered in order of criticality to plant operations. For this alternative, all systems and equipment given a Subgrantee-defined tier of 1 (most critical) to 4 (least critical) would be protected to the 500-year flood elevation plus freeboard and sea level rise. This would allow conveyance and critical treatment operations to continue in the event of a flood. This would allow conveyance and critical treatment operations to continue in the event of a flood. which includes applicable codes and

standards and conditions to comply with requirements of EO 11988 and the implementing regulations at 44 CFR Part 9.

The executive order allows for locating these actions in the floodplain because the impacts of the action can be minimized and the importance of the action clearly outweighs other Executive Order requirements.

The mitigation of individual items at the currently proposed locations is a practicable option but has not been selected by Nassau County as a viable alternative. This alternative is economically feasible, socially acceptable, but it has been determined that Alternative 2 is the better option by the local community.

- **Alternative 4:** Relocation - flood mitigation alternative for the Bay Park STP includes relocating the Bay Park STP to a new location that is outside of the 500-year floodplain. In addition to meeting the mitigation objectives, this alternative presents the benefit of allowing the existing plant to continue its operations uninterrupted while the new plant is constructed.

  This alternative mitigation option was ultimately dismissed for a number of reasons, including anticipated difficulty in finding a new location, regulatory compliance concerns, and anticipated cost. The land adjacent to the plant that is currently occupied by a golf course was considered as a potential location for the facility relocation mitigation option. The new plant would be able to implement state-of-the-art technologies and processes to enhance efficiency, effluent quality, and maintenance requirements. The existing golf course is at a higher elevation than the existing plant, but the land is still susceptible to flood impacts during a 500-year flood event. The new buildings housing critical assets would be designed so that critical assets would be above the 500-year flood elevation, thus maintaining the plant's functionality during a flood event.

  The golf course occupies more land than the existing Plant and suggests the area of the golf course would be sufficient for a new plant provided all else (e.g. hydraulic capacity and degree of treatment) remains equal. The relocation of the Plant would affect a large physical area. The new plant would have a larger footprint (67 acres) than the existing plant (44 acres) and would impact the areas around the plant. During construction, disturbance may be seen to the immediate surrounding area, but this will also be contained within Bay Park STP. The area of disturbance would be kept within the boundary of the plant's campus and the immediately surrounding street areas. Once the construction has been completed, the site would be restored to near original conditions. Roadways, sidewalks, curbs, and plant life would be restored where possible to meet or exceed existing conditions. The relocation of the plant to the land currently

occupied by the golf course would result in a temporary loss of park land for the community until the construction of the new plant has been completed, the existing plant demolished, and the existing plant land converted to park land. According to the US Census, the population density in Nassau County in 2010 was 4,704.8 persons per square mile, compared with 411.2 persons per square mile in all of New York State. This high population density would make it difficult to find another feasible alternative location to build a 40+ acre facility. Additionally, an alternate location besides the existing golf course land would be significantly more expensive, as this would require the design and construction of a potentially very long stretch of pipe to transport the treated sewage to the outfall. This would also require the redirection of all collection and interceptor infrastructure as well as the construction of new pumping and metering stations. This construction would cause large scale disruption to local roadways. In addition, there would be significant environmental regulatory issues to be addressed during the development process. While relocating the facility would provide protection to the plant's critical assets and functionality during a flood event, this alternative mitigation option has been dismissed due to the difficulty of finding an adequate alternative site, regulatory compliance concerns, and high anticipated cost relative to the other options considered.

STEP 4 & 5 Identify the full range or potential direct or indirect impacts associated with, the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action (see 44 CFR 9.10) & STEP 5 Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under step # 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see 44 CFR 9.11).

Applicable - Alternatives identified in the EA Document or is described below:

Alternative 2: The alternative project at the currently proposed location results in mitigation, and in some instances replacement, of the damaged buildings, with the extra flood protection measure of a site berm, which eliminates the hazards future flooding events. The action requires significantly less resource and initiative than relocation outside the special flood hazard area and has been selected as a practicable alternative by those representing the community served.

The Proposed Action would provide flood damage risk reduction at or above the 500-year flood elevation for the facility complex. Flood mitigating the facility would minimize potential for disruption of this

critical utility service during a flood event. The project's public benefits to human health, safety and welfare outweigh the minor or negligible adverse effects of the risk to the proposed federal investment into a facility located in the floodplain. The proposed flood hazard risk reduction measures would minimize the risk of partial or full suspension of facility operations during future flooding events. This would minimize risk of release of untreated sewage from entering surrounding water systems.

A Hydraulic study was conducted to show the impacts this alternative, inclusive of the fill associated with the berm and park grade increase, would have on the floodplain. The hydraulic study used the FEMA Region II Simulating Waves Nearshore and The Advanced Circulation computer models. The models were run using four locations near Bay Park and were run with proposed project and current conditions imputed in for comparison. The project was determined to have negligible impact on water surface elevation and storm surge redistribution. The impact to flood storage capacity is minimal in the tidal flooding context of the facility. The proposed action would not increase the water surface elevation of the base flood more than one foot at any point within the community. Stormwater drainage swales will be installed at the toe of the earthen berm to avoid or minimize induced flooding onto neighboring residential properties.

A relatively small square footage of existing lawn and upland landscape areas would be converted to impervious cover; however, the project would not impact the overall floodplain function or value of the area. The Subgrantee would be responsible to coordinate the project with the local floodplain administrator and NYSDEC to obtain all applicable permits or authorizations related to floodplain management. All applicable permits would be obtained to comply with the Clean Water Act (P.L. 95-217) and SPDES as previously described.

Included in the design are vegetated swales and underground stormwater retention that would help manage stormwater. The relocation of Marjorie Lane, away from the water, would also reduce the amount of stormwater runoff from the road reaching this body of water, thus improving the quality of this water body in the vicinity of the project site.

STEP 6 **Reevaluate the proposed action to determine first, if it's still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others and its potential to disrupt floodplain and wetland values and second, if alternatives preliminarily rejected at step # 3 are practicable in light of the information gained in steps # 4 and # 5. FEMA shall not act in a floodplain or wetland unless it's the only practicable location.**

Applicable - Action proposed is located in the only practicable location as described below:

The proposed action is the chosen practicable alternative based upon a review of possible adverse effects on the floodplain and community/socioeconomic expectations. The public benefits of the project outweigh the risk of investment in floodplain located structures.

STEP 7 **Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative (see 44 CFR 9.12).**

Applicable - Finding is or will be prepared as described below:

An initial Cumulative Public Notice was published on 12/14/2012. The Final Notice will be incorporated in the Finding of No Significant Impact Statement for the Environmental Assessment.

STEP 8 **Review the implementation and post-implementation phases of the proposed action to ensure that the requirements of the order are fully implemented. Oversight responsibility shall be integrated into existing processes.**

Applicable - Approval conditioned on review of implementation and post-implementation phases to ensure compliance with the order(s).

Review the implementation and post- implementation phase of the proposed action to ensure that the requirement stated in 9.11 are fully implemented.

Applicable - Oversight responsibility established as follows:

Oversight responsibility shall be integrated into existing processes and project completion in accordance with all applicable floodplain ordinances and codes and standards shall be verified at project

Appendix Document L
EFH Assessment

EFH ASSESSMENT for Bay Park Waste Water Treatment Plant PAAP

PROJECT NAME: Wastewater Facilities PAAP
PROJECT NO: 3714

Applicant: Nassau County

DATE: 5/31/2014
LOCATION: Bay Park Waste Water Treatment Plant (WWTP) and outflow pipe in Reynolds Channel
PREPARER: Brandon Webb

1. INITIAL CONSIDERATIONS		
EFH Designations	**Yes**	**No**
Is the action located in or adjacent to EFH designated for eggs?	X	
Is the action located in or adjacent to EFH designated for larvae?	X	
Is the action located in or adjacent to EFH designated for juveniles?	X	
Is the action located in or adjacent to EFH designated for adults?	X	
Is the action located in or adjacent to EFH designated for spawning adults?	X	

2. SITE CHARACTERISTICS	
Site Characteristics	**Description**
Is the site intertidal, sub-tidal, or water column?	**There are intertidal, sub-tidal and water column areas adjacent to the project site.**
What are the sediment characteristics?	**The inter-tidal and sub-tidal areas adjacent to the project site are comprised of an unconsolidated bottom. This habitat type has at least 25% cover of particles smaller than stones (less than 6-7 cm) and a vegetative cover less than 30%. The surrounding emergent and unconsolidated shore could be affected by untreated effluent, particularly during storm events.**
Is Habitat Area of Particular Concern (HAPC) designated at or near the site? If so what type, size, characteristics?	**There are no HAPCs adjacent to WWTP and the outflow pipe that discharges to Reynolds Creek. HAPCs that could be affected by untreated effluent include salt and brackish water marshes, freshwater marshes, swamps, and scrub-shrub wetlands. (see Environmental Sensitivity Index Map below)**
Is there submerged aquatic vegetation (SAV) at or adjacent to project site? If so describe the spatial extent.	**Viewing Google Earth, there are no SAV at or adjacent to both the WWTP and the outflow pipe. Aquatic Beds could be affected by untreated effluent.**
What is typical salinity and temperature regime/range?	**Average Salinity: 32.5 psu Average Temp: 50 deg Fahrenheit**
What is the normal frequency of site disturbance, both natural and man-made?	**Routine vessel traffic and infrastructure maintenance work disturbs May disturb the EFH as do Nor'easters and hurricanes.**

What is the area of proposed impact (work footprint & far afield)?	**Selected Alternative and Other Action Alternative work will not have an impact on fisheries, provided the Best Management Practices are being successfully applied. The No Action alternative will have a negative impact on EFH around outflow pipe in the event of another flooding event that disrupts the WWTP processes.**

3. DESCRIPTION OF IMPACTS			
Impacts	**Y**	**N**	**Description**
Will benthic community be disturbed?		**X**	No, all work is on site, out of water, with Best Management Practices in place. With No Action Alternative, there will be no disturbance of benthic community in the event of a plant failure.
Will SAV be impacted?		**X**	No, all work is on site, out of water, with Best Management Practices in place. With No Action Alternative, SAV may be negatively impacted by a future flooding event disturbing plant process.
Will sediments be altered and/or sedimentation rates change?		**X**	No, all work is on site, out of water, with Best Management Practices in place, and fill is imported from off site. With No Action Alternative, there will be no disturbance of sedimentation rates in the event of a plant failure.
Will turbidity increase?		**X**	No, all work is on site, out of water, with Best Management Practices in place. With the No Action Alternative, there is potential for increase flow during a flood event from the outflow pipe.
Will water depth change?		**X**	No, work will have no effect on water depth.
Will contaminants be released into sediments or water column?		**X**	No, all work is on site, out of water, with Best Management Practices in place. With the No Action Alternative, there is potential for contaminate release during a flood event from the outflow pipe.

Will tidal flow, currents or wave patterns be altered?		**X**	No, all work is on site, out of water, with Best Management Practices in place.
Will ambient salinity or temperature regime change?		**X**	No, all work is on site, out of water, with Best Management Practices in place. The No Action Alternative may change salinity or temperature with the release of untreated effluent during a future flood event.
Will water quality be altered?		**X**	No, all work is on site, out of water, with Best Management Practices in place. The No Action Alternative may alter water quality with the release of untreated effluent during a future flood event.

4. EFH ASSESSMENT			
Functions and Values	**Y**	**N**	**Describe habitat type, species and life stages to be adversely impacted**
Impact Site:			The EFH adjacent to the project site will not be adversely impacted because all work will be above the mean high water and Best Management Practices will be in place during construction activities.
Eggs		**X**	FEMA has determined that the implementation of this action will have no substantial adverse individual or cumulative effects on egg habitat that may be found in the EFH area adjacent to the project site. The No Action Alternative; however, may negatively affect egg habitats of following species: Monkfish, Red Hake, Silver Hake, Window Pane Flounder, and Winter Flounder in the EFH area adjacent to the project site.
Spawning		**X**	FEMA has determined that the implementation of this action will have no substantial adverse individual or cumulative effects on optimal spawning habitat that may be found in the EFH area adjacent to the project site. The No Action Alternative may negatively affect eggs habitat of following species: Monkfish, Red Hake, Silver Hake, Window Pane Flounder, and Winter Flounder in the EFH area adjacent to the project site.

Nursery		**X**	FEMA has determined that the implementation of this action will have no substantial adverse individual or cumulative effects on optimal nursery habitat that may be found in the EFH area adjacent to the project site. The No Action Alternative may negatively affect eggs habitat of following species: Atlantic Herring, Bluefin Tuna, Little Skate, Monkfish, Red Hake, Sandbar Shark, Silver Hake, Tiger Shark, White Shark, Window Pane Flounder, Winter Flounder, and Winter Skate in the EFH area adjacent to the project site.
Forage		**X**	FEMA has determined that the implementation of this action will have no substantial adverse individual or cumulative effects on optimal foraging habitat that may be found in the EFH area adjacent to the project site. The No Action Alternative may negatively affect eggs habitat of following species: Atlantic Herring, Bluefin Tuna, Dusky Shark, Little Skate, Monkfish, Red Hake, Sandbar Shark, Silver Hake, Tiger Shark, White Shark, Window Pane Flounder, Winter Flounder, and Winter Skate in the EFH area adjacent to the project site.
Shelter		**X**	FEMA has determined that the implementation of this action will have no substantial adverse individual or cumulative effects on optimal shelter habitat that may be found in the EFH area adjacent to the project site. The No Action Alternative may negatively affect eggs habitat of following species: Atlantic Herring, Bluefin Tuna, Dusky Shark, Little Skate, Monkfish, Red Hake, Sandbar Shark, Silver Hake, Tiger Shark, White Shark, Window Pane Flounder, Winter Flounder, and Winter Skate in the EFH area adjacent to the project site.
Will impacts be temporary or permanent?		**X**	No impact will occur in Proposed and Other Action alternative. The No Action Alternative could have both temporary and permanent impacts on fisheries habitat depending on severity, timing, and length of untreated effluent during a flood event.
Will compensatory mitigation be used?	**X**		Proposed and Other Action will mitigate against the 500 year flood level to prevent future untreated effluent from entering Reynolds Channel.

5. DETERMINATION OF IMPACT		
	✍	**Federal Agency's EFH Determination**
Overall degree of adverse effects on EFH (not including compensatory mitigation) will be: **(check the appropriate statement)**	**X**	**There is no adverse effect on EFH, only No Action Alternative could potential harm EFH.** **EFH Consultation is not required**
		The adverse effect on EFH is not substantial. **This is a request for an abbreviated EFH consultation. This worksheet is being submitted to NMFS to satisfy the EFH Assessment requirement.**
		The adverse effect on EFH is substantial. **This is a request for an expanded EFH consultation. A detailed written EFH assessment will be submitted to NMFS expanding upon the impacts revealed in this worksheet.**

6. OTHER NOAA-TRUST RESOURCES IMPACT ASSESSMENT

Species	Eggs	Larvae	Juveniles	Adults
Little Skate			x	x
Winter Skate			x	x
Barn Skate				X
Clearnose Skate				X

Shortnose sturgeon				X
Green sea turtle				X
Kemp ridley				X
Loggerhead				X

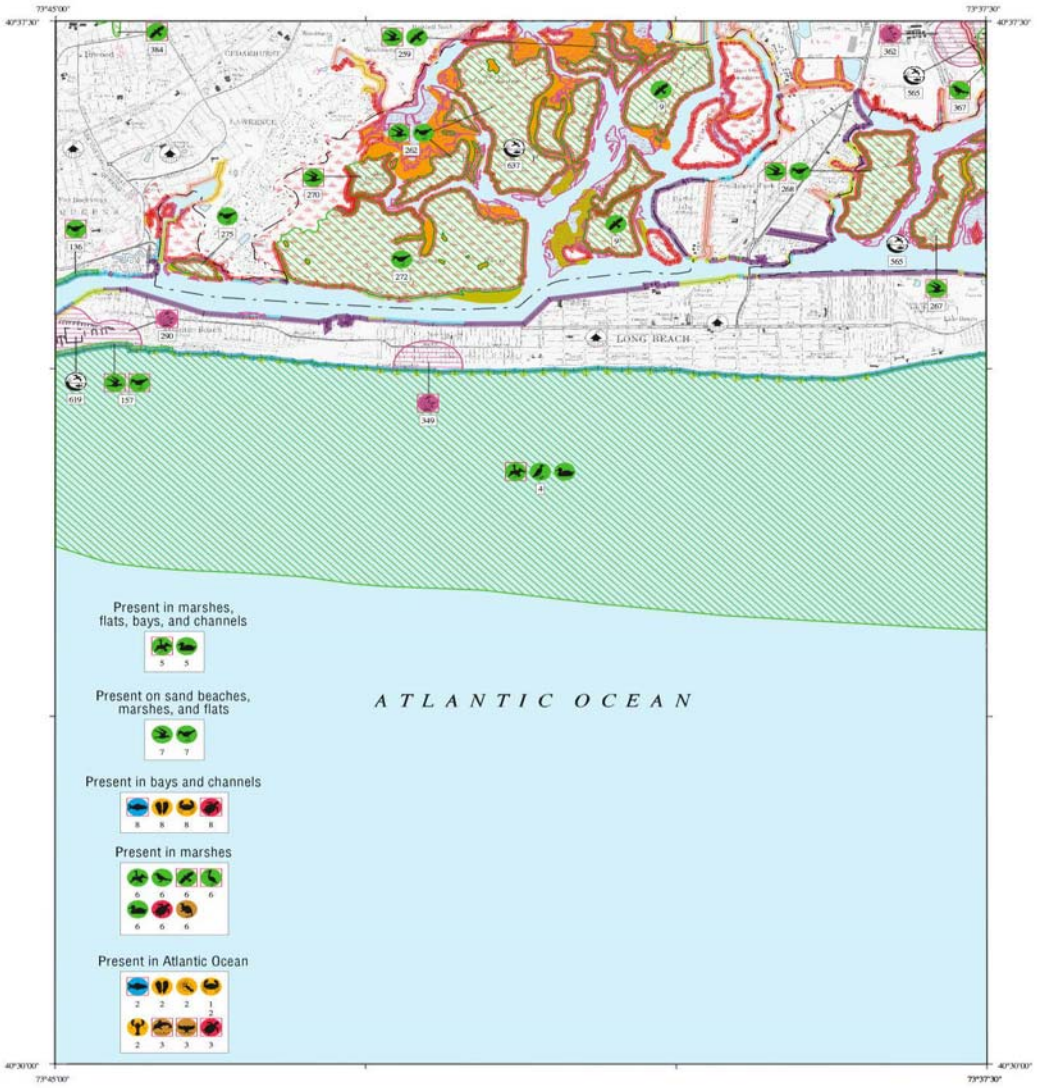
Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Great South Bay estuary affecting the following: Western Long Beach, NY., Hewlett, NY., Woodmere, NY., Cedarhurst, NY., Lawrence, NY., Inwood, NY., Far Rockaway, NY., East Rockaway Inlet, eastern Jamaica Bay, Brosewere Bay, Grassy Bay, Head of Bay, Grass Hassock Channel, eastern Rockaway Beach, Atlantic Beach, Howard Beach, J. F. K. International Airport, Springfield, NY., and Rosedale, NY., along with many smaller islands.

Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**
Alewife		X	X	X
American eel			X	X
American shad			X	X
Atlantic salmon *(Salmo salar)*				X
pollock *(Pollachius virens)*			X	
whiting *(Merluccius bilinearis)*	X	X	X	
red hake *(Urophycis chuss)*	X	X	X	
winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
windowpane flounder *(Scophthalmus aquosus)*			X	X

Atlantic sea herring *(Clupea harengus)*			X	X
Bay Anchovy				X
Blueback herring			X	X
monkfish *(Lophius americanus)*	X	X		X
bluefish *(Pomatomus saltatrix)*			X	X
Atlantic butterfish *(Peprilus triacanthus)*	X	X	X	X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	X
Mummichog				X
summer flounder *(Paralichthys dentatus)*			X	X
scup *(Stenotomus chrysops)*	n/a	n/a	X	X
black sea bass *(Centropristis striata)*	n/a		X	
Striped bass				X
king mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
cobia *(Rachycentron canadum)*	X	X	X	X

Tautog				X
Weakfish				X
White perch				X
sand tiger shark *(Carcharias taurus)*		X		
blue shark (*Prionace glauca)*				X
dusky shark *(Carcharhinus obscurus)*		X		
sandbar shark *(Carcharhinus plumbeus)*		X	X	X
tiger shark *(Galeocerdo cuvieri)*		X		

ENVIRONMENTAL SENSITIVITY INDEX MAP



SHORELINE HABITATS (ESI)

- 1B EXPOSED, SOLID, MAN–MADE STRUCTURES
- 2A EXPOSED WAVE–CUT PLATFORMS IN MUD
- 2B EXPOSED SCARPS AND STEEP SLOPES IN MUD
- 3A FINE– TO MEDIUM–GRAINED SAND BEACHES
- 3B SCARPS AND STEEP SLOPES IN SAND
- 4 COARSE–GRAINED SAND BEACHES
- 5 MIXED SAND AND GRAVEL BEACHES
- 6A GRAVEL BEACHES
- 6B RIPRAP
- 7 EXPOSED TIDAL FLATS
- 8B SHELTERED, SOLID MAN–MADE STRUCTURES
- 8C SHELTERED RIPRAP
- 9A SHELTERED TIDAL FLATS
- 9B VEGETATED LOW BANKS
- 10A SALT– AND BRACKISH–WATER MARSHES
- 10B FRESHWATER MARSHES
- 10C SWAMPS
- 10D SCRUB–SHRUB WETLANDS

SCALE 1:50000

1 .5 0 1 KILOMETER

1 .5 0 1 MILE

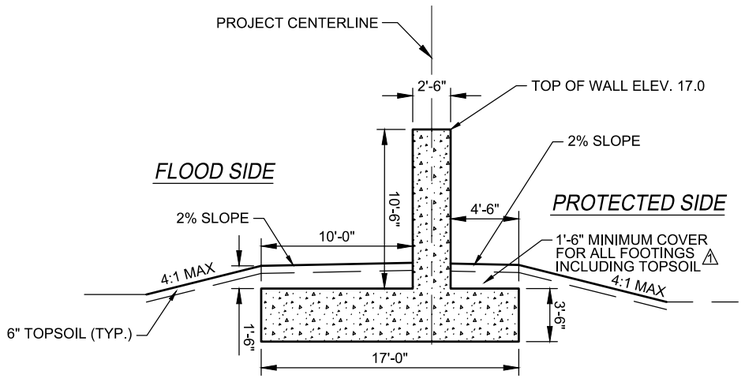
Not For Navigation

Published: March 2009

Published at Seattle, Washington
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Emergency Response Division

LAWRENCE, N.Y. ESI-1

Appendix Document M
Footing and Pile Depths Specifications



T-WALL SECTION - TYPE A

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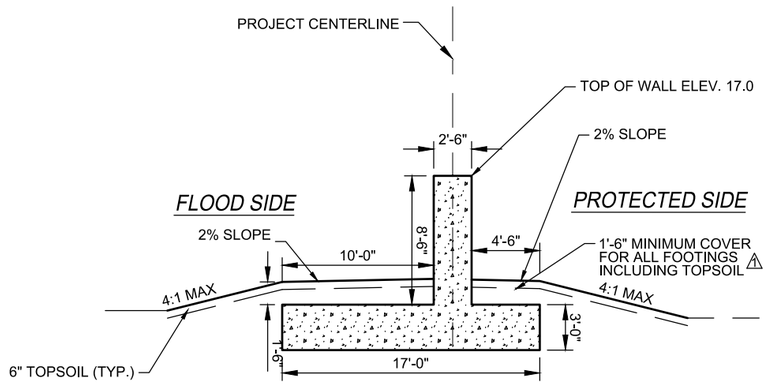

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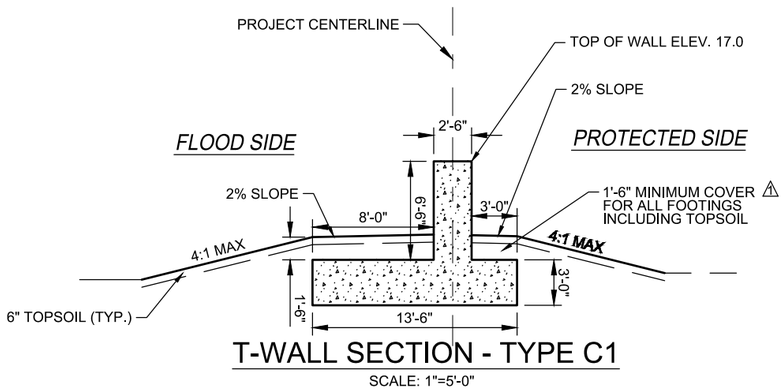

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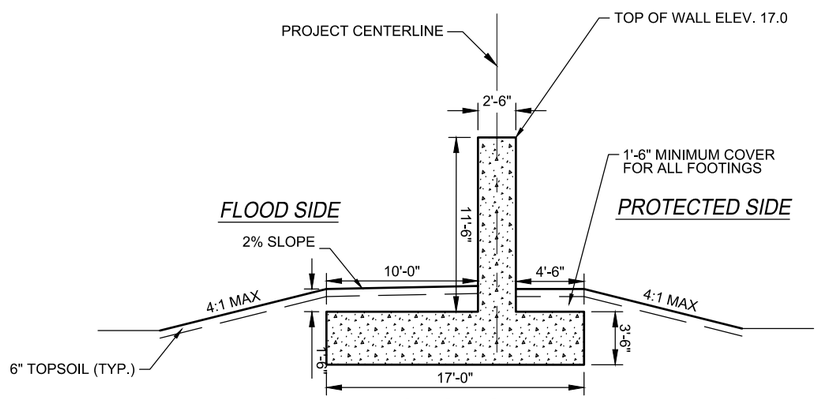

T-WALL SECTION - TYPE D

SCALE: 1"=5'-0"

NOTES:

1. PILES, STABLIZATION SLABS AND SLURRY WALLS NOT SHOWN ON CIVIL TYPICAL SECTIONS FOR CLARITY. REFER TO STRUCTURAL WALL SECTIONS FOR DETAILS ON S-121 AND S-122.
2. FINAL 6" OF DISTURBED AREAS SHALL BE FILLED WITH TOPSOIL AND GRASSED PER SPECIFICATIONS. CONTRACTOR SHALL SEED TOPSOIL WITHIN 48 HOURS OF FINAL PLACEMENT AND SHALL ACCOUNT FOR LOSSES DUE TO WEATHER EVENTS. EROSION. LOSSES FROM RAINFALL SHALL BE SALVAGED ON SITE AND/OR REPLACED BY THE CONTRACTOR AND RE-SEEDED AT HIS COST.
3. THE SLURRY WALL WILL BE COMPOSED OF MATERIAL THAT WILL SET SIMILAR TO A STIFF CLAY. NO SPECIAL CROSSINGS OR CASINGS ARE REQUIRED FOR UTILITIES BEING CROSSED UNLESS SPECIFIED BY A LOCAL UTILITY PROVIDER.
4. BENEATH UTILITIES, JET GROUTING WILL BE USED IN LIEU OF SLURRY WALL SEE SPECIFICATION 13005-JET GROUTING.

0 5' 10'

SCALE:1"=5'

HAZEN AND SAWYER
Environmental Engineers & Scientists
LEGAL ENTITY:
MALCOLM PIRNIE, INC.
ARCADIS
A JOINT VENTURE

SEALS

NASSAU COUNTY, NEW YORK
NASSAU COUNTY DPW

BAY PARK FLOOD PROTECTION

NO.	DATE	ISSUED FOR	BY
⚠	02/14/14	ADDENDUM 1	RCS
	04/04/14	CONFORMED	SMC

DATE: FEBRUARY 2014
PROJECT NO.: 00726788.0000
FILE NAME: C106_WALLTYPS.DGN
DESIGNED BY: RCS
DRAWN BY: GJK
CHECKED BY: DRE

SHEET TITLE

TYPICAL SECTIONS T–WALLS

SCALE: AS SHOWN

C–106

MONOLITH TYPE	MONOLITH NUMBERS	QTY MONOLITH	CUT OFF	NUMBER REQUIRED		PILE SIZE	PILE TIP EL.	LENGTH OF EACH PILE (LF)	TOTAL LENGTH EA MONOLITH (LF)	SLURRY WALL TIP EL.	MAX PILE LOAD		
				EACH MONOLITH	TOTAL						COMPRESSION (KIPS)	TENSION (KIPS)	LATERAL (KIPS)
A7	1	1	3.25	12	12	24"	-30	33.25	399.00	-25	101.44	55.63	19.00
A1	2-10	9	3.25	14	126	24"	-28.5	31.75	444.50	-25	78.20	14.33	18.00
A2	11-12	2	3.25	8	16	24"	-28.5	31.75	254.00	-25	87.40	20.33	20.60
A4	13	1	3.25	9	9	24"	-28.5	31.75	285.75	-25	108.74	55.51	21.62
A3	14	1	3.25	6	6	24"	-28.5	31.75	190.50	-25	83.60	24.00	20.13
C1	15	1	7.75	6	6	18"	-37	44.75	268.50	-25	60.50	21.00	15.13
C1	16	1	7.75	6	6	18"	-37	44.75	268.50	-25	60.50	21.00	15.13
A3	17	1	3.25	6	6	24"	-25	28.25	169.50	-25	83.60	24.00	20.13
A5	18	1	3.25	16	16	24"	-25	28.25	452.00	-25	115.10	53.40	25.60
A1	19	1	3.25	14	14	24"	-25	28.25	395.50	-25	78.20	14.33	18.00
A3	20	1	3.25	6	6	24"	-25	28.25	169.50	-25	83.60	24.00	20.13
GATE 1	21-22	2	3.45	18	36	24"	-30	33.45	602.10	-25	75.73	12.87	16.40
A6	23	1	3.25	9	9	24"	-25	28.25	254.25	-25	109.76	55.10	22.00
B2	24	1	5.75	6	6	24"	-25	30.75	184.50	-25	84.60	33.60	17.13
B5	25	1	5.75	9	9	24"	-25	30.75	276.75	-25	142.28	92.69	25.15
B2	26-27	2	5.75	6	12	24"	-25	30.75	184.50	-25	84.60	33.60	17.13
C1	28	1	7.75	6	6	18"	-47	54.75	328.50	-25	60.50	21.00	15.13
C1	29	1	7.75	6	6	18"	-47	54.75	328.50	-25	60.50	21.00	15.13
D2	30-31	2	2.25	6	12	24"	-34	36.25	217.50	-25	90.13	28.47	21.67
D4	32	1	2.25	14	14	24"	-36	38.25	535.50	-25	88.80	13.35	16.70
D1	33	1	2.25	14	14	24"	-34	36.25	507.50	-25	84.67	18.53	19.67
D1	34	1	2.25	14	14	24"	-34	36.25	507.50	-25	84.67	18.53	19.67
D5	35	1	2.25	9	9	24"	-34	36.25	326.25	-25	115.26	58.68	23.83
D1	36	1	2.25	14	14	24"	-34	36.25	507.50	-25	84.67	18.53	19.67
D3	37-38	2	2.25	8	16	24"	-34	36.25	290.00	-25	94.47	25.07	22.33
D5	39	1	2.25	9	9	24"	-34	36.25	326.25	-25	115.26	58.68	23.83
D2	40	1	2.25	6	6	24"	-34	36.25	217.50	-25	90.13	28.47	21.67
C1	41	1	7.75	6	6	18"	-45	52.75	316.50	-25	60.50	21.00	15.13
C1	42	1	7.75	6	6	18"	-45	52.75	316.50	-25	60.50	21.00	15.13
D2	43	1	2.25	6	6	24"	-33	35.25	211.50	-25	90.13	28.47	21.67
D1	44	1	2.25	14	14	24"	-33	35.25	493.50	-25	84.67	18.53	19.67
D6	45	1	2.25	20	20	24"	-35	40	800.00	-25	180.60	106.71	56.47
D1	46	1	2.25	14	14	24"	-33	35.25	493.50	-25	84.67	18.53	19.67
GATE 2	47	1	1.25	18	18	24"	-33	34.25	616.50	-25	75.73	12.87	16.40
D1	48-49	2	2.25	14	28	24"	-30	32.25	451.50	-25	84.67	18.53	19.67
D1	50-58	9	2.25	14	126	24"	-30	32.25	451.50	-25	84.67	18.53	19.67
D1	59-63	5	2.25	14	70	24"	-30	32.25	451.50	-25	84.67	18.53	19.67
D1	64-65	2	2.25	14	28	24"	-25	27.25	381.50	-25	84.67	18.53	19.67
GATE 3	66	1	4.5	14	14	24"	-25	29.5	413.00	-25	84.67	18.53	19.67

HAZEN AND SAWYER
Environmental Engineers & Scientists
LEGAL ENTITY:
MALCOLM PIRNIE, INC.
ARCADIS
A JOINT VENTURE

SEALS

NASSAU COUNTY DPW

BAY PARK
FLOOD PROTECTION

NO.	DATE	ISSUED FOR	BY
	4/4/14	CONFORMED	SMC
4	MAR 2014	ADDENDUM 4	JLA
1	FEB 2014	ADDENDUM 1	JLA

DATE: JANUARY 2014
PROJECT NO.: 00726788.0000
FILE NAME: 00726788.0000-STR-
DESIGNED BY: JLA
DRAWN BY: SMEN
CHECKED BY: MBE

SHEET TITLE

PILE SCHEDULE

SCALE: AS SHOWN

S-150

Appendix Document N
Vibratory Beam Slurry Wall Specification

PART 1 [1]**GENERAL**

1.01 DESCRIPTION

A. Scope:

Provide all labor, materials, and equipment necessary for the construction of the vertical barrier with minimal excavation at the locations and to the lines, grades, and cross-sections, as specified on the drawings and as adapted and verified in the field during construction. The works include the installation of vertical slurry walls at the locations shown on the plans and as directed by the ENGINEER.

B. Terminology

1. Vibrated Beam Method

a. Method of constructing a vertical barrier using a steel wide flange beam, generally 33 X 152 plus a 14-inch fin, to penetrate and inject slurry through the existing soil to the required depth of the confining soil layer, or refusal, whichever occurs first. The fin acts as guide for the beam ensuring a continuous wall.

b. The Vibrated Beam Method utilizes a crane with a specially fabricated wide flange beam connected to a large vibratory hammer. The vibratory hammer enables the vibrated beam to penetrate the subsoils. Slurry is injected at the base of the vibrated beam to create a non-erodible slurry wall panel.

c. Each beam penetration in plan view is 47 inches long (33-inch beam plus the 14-inch fin). The continuous vertical barrier is created by advancing the beam 30 inches thereby overlapping the previous 47-inch beam penetration (panel) approximately 17 inches. The 17-inch overlap is created from the 14-inch fin and 3 inches of the wide flange beam.

2. Vertical Barrier/Finished Product – A continuous low-permeability water barrier with an average thickness of 4-inches, formed by injecting a non-erodible slurry with the appropriate slurry mixture. The vertical barrier must be constructed with minimal excavation.

3. Work Platform – The prepared ground surface from which the vertical barrier construction activities take place. The work platform shall always be a minimum of three (3) feet above the groundwater level. The work platform shall have a width no less than 16 feet. A 24-foot width platform is preferred. The slope along the wall

[1] **Section 13001 replaced in its entirety by Addendum No. 1**

alignment shall not exceed one (1) foot in 100 feet. The slope in the transverse direction shall not exceed a few inches.

4. Groundwater Level – The piezometric level of the groundwater determined from piezometers installed in the ground in strata of the same hydro geologic unit as the vertical barrier and within reasonable proximity to the vertical barrier.

5. Hydraulic Conductivity – Hydraulic conductivity of cured slurry sampled at the slurry nozzle (or mixing plant) and measured in accordance with ASTM D 5084. This is indicative of the hydraulic conductivity of the slurry wall as installed but not equivalent.

6. Panel/Segment – The portion of the vertical barrier constructed by one insertion/removal of the vibrated beam with the associated slurry injection.

7. Slurry- lmpermix® - The attapulgite clay-slag cement mixture injected from the vibrated beam to the subsurface to form the slurry wall. lmpermix® is a patented product supplied by Liquid Earth Support, Inc. of Pelham, New York.

1.02 REFERENCES

A. The publications listed form a part of this specification. Each publication shall be the latest revision and addendum issued at the time of the Contract and issue of this specification unless noted otherwise. Except as modified by the requirements specified herein or the details on the drawings, work included in this specification shall conform to the applicable provisions of these publications.

1. API (American Petroleum Institute)

   a. API RP 13A Oil Well Drilling Fluid Materials

   b. API RP 13B Standard Procedure for Testing Drilling Fluid

2. ASTM (American Society for Testing and Materials)

   a. ASTM C 150/C150M, Specification for Portland Cement

   b. ASTM D 5084, Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

   c. ASTM D 4801, Standard Specification for Polyethylene Sheeting in Thickness of 0.010 in. and Greater

   d. ASTM D 5203, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials from Recycled Post Consumer (HDPE) Sources

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of this specification.

B. Slurry Mix Design

1. The CONTRACTOR shall submit a mix design for the slurry to be used on this project. The slurry shall be non-erodible and composed of IMPERMIX. The mix design shall be based on laboratory evaluation and/or previous project performance. The mix shall demonstrate the proposed slurry wall will achieve an in-situ hydraulic conductivity of less than or equal to 1×10^{7} cm/sec.

C. Construction Work Plan

1. The CONTRACTOR shall submit a construction work plan for approval by the ENGINEER within 15 calendar days after receipt of Notice of Award. The work plan shall include the following items:

a. Method for Vertical Barrier Construction

1) A detailed description of the methods of construction which shall include the vertical barrier construction methods, material handling, and slurry mixing/ handling.

b. Equipment

1) A list of major equipment by type and capacity which shall include the crane, vibratory hammer, slurry mixer and pumps, material handler, support & transport equipment., or other equipment as required by the method chosen.

c. The plan shall include description of the following:

1) Quality control testing and sampling equipment.

2) Quality control testing and sampling methods.

d. The plan shall include minimum standards with which to gauge the quality of the work during construction including slurry viscosity, control of penetration depth, and penetration plumbness.

e. The plan shall address the physical properties and manufacturer's stated properties for all permanent materials, including manufacturer's certifications of quality, mill certificates, and gradation test data (if required).

f. The plan shall address how excavations around and beneath utilities and pipes will be performed. Included in the plan will

be the methodology for supporting the utilities and pipes within the excavation. Due to the size and location of the utilities, beneath the utilities and pipes Section 13005 Jet Grouting will be required. The jet grouting methodology will be incorporated into the plan.

g. The plan shall state the correction procedures which will be employed in the case of substandard results. Quality control records shall be submitted to the ENGINEER on a daily basis. The ENGINEER shall be responsible for distribution of QA data to the QA personnel.

1.04 QUALIFICATIONS

A. The installation of the vertical barrier shall be carried out by a qualified CONTRACTOR experienced in the Vibrated Beam Method, or equivalent. A qualified CONTRACTOR is defined as having at least 10 years direct experience with the Vibrated Beam Method, or equivalent. A qualified CONTRACTOR shall have self-performed not less than 5 projects of similar scope. The CONTRACTOR will be required to submit evidence that competent personnel are available to carry out the operations specified, that such personnel will be assigned to this project, and that such personnel will have previous experience in the Vibrated Beam Method, or equivalent. Documentation of work experience shall be provided by the CONTRACTOR with the bid.

B. A construction and slurry wall specialist(s) provided by the CONTRACTOR, as approved by the ENGINEER, having experience with the Vibrated Beam Method of vertical barrier construction (or methodology chosen) shall be used to supervise construction, slurry preparation, and quality control. The specialist(s) shall be at the site of operation at all times that the installation is in process. The knowledge and experience of the specialist(s) should include, but not necessarily be limited to:

1. Mixing methods required to properly mix the slurry required.

2. Construction equipment, materials, testing and quality control- as required for vertical barrier construction using the Vibrated Beam Method, or equivalent. The specialist(s) shall control the mixing, composition, placement, cleaning, and maintenance of the slurry. The credentials of the specialist(s) shall be submitted to the ENGINEER for approval 15 calendar days prior to vertical barrier construction.

1.05 SITE CONDITIONS

A. The CONTRACTOR is aware of the site conditions at this site.

B. If groundwater level at the site is very shallow, then a work platform will need to be constructed by others prior to the vertical barrier construction. The work platform is needed to provide a stable working surface and increased freeboard height to enhance slurry wall stability. A minimum of 3 feet of freeboard between the top of the slurry wall and the water table must be obtained. Dewatering may need to be done by others to obtain the minimum of 3 feet. In creating the working platform, the work shall be performed so as to minimize potential slope instability of the working platform.

C. The proposed alignment may traverse utilities & pipes. The CONTRACTOR shall be prepared to excavate and support utilities and pipes while installing the slurry wall.

D. It is the CONTRACTOR's responsibility to protect his equipment and the elements of the constructed product from adverse effects due to cold weather and freezing, hot weather, and heavy rains causing possible site flooding.

PART 2 PRODUCTS

2.01 MATERIALS

A. Slurry

1. The design and specification contained herein have considered that IMPERMIX® will be used.

    a. The use of admixture, or any plugging or bridging agent not identified in the submitted mix design, will not be permitted without prior written authorization from the ENGINEER.

    b. A written certificate specifying the quality of the components shall be provided by the CONTRACTOR for each shipment received.

    c. Water shall be potable, therefore, clean, fresh, and free from oil, acid, alkali, organic matter, or other deleterious substances.

B. HDPE Sheeting

1. The prefabricated plastic sheets shall consist of a 60 mil High Density Polyethylene (HDPE) liner with HDPE interlocks at a minimum distance of 3 feet. The locks shall be welded onto the material at the factory or at the site. The welding method shall be a hot air welding, wedge welding, or an extrusion welding system. The strength of the weld shall be at least 85% of the strength of the liner material. One test sample shall be taken every 25 welds to control the quality of the welding. The plastic sheets shall meet the following specifications:

The CONTRACTOR shall submit a 3-foot sample of the plastic material. Approval of the material by the ENGINEER shall be required prior to the site delivery of the plastic sheet material. The sheet material shall be free of defects, rips, holes or flaws. Manufacturer certification shall be provided for all sheet material delivered to the project.

2.02 EQUIPMENT

A. General

1. The vertical barrier shall be constructed using suitable equipment capable of producing a finished product, as specified. All equipment shall be free of fluid leaks which discharge substances onto the ground. All broken or leaky lines, hoses, valves, pistons, pipes, tanks, and other equipment components shall be immediately repaired or removed. Equipment shall be maintained in such a condition so as to deliver the manufacturer's rated output. If inadequate quality of production is obtained, larger and/or different equipment must be provided by the CONTRACTOR.

B. Slurry Mixing & Placing Equipment

1. The slurry shall be mixed in a mixing plant which shall include a high-speed/high shear colloidal mixer, or other equipment that achieves complete dispersion of the components and produces a stable, homogenous slurry mix. The plant shall be capable of providing a continuous supply of slurry to the vertical barrier during construction. The necessary pumps, sumps, hoses, valves, supply lines, mixers, and tools shall be provided by the CONTRACTOR.

C. Vibrated Beam

1. The vibrated beam shall be a 33-inch wide flange beam, plus a 14-inch fin with appropriate slurry nozzles affixed to the bottom of the beam. The thickness of the driving shoe, as measured perpendicularly to the web shall be at least 4.5 inches. The web of the beam is built-up depending on soil conditions. Attached to the wide flange beam are slurry pipes for the injection of slurry. Each beam must be of sufficient length to penetrate the maximum expected depth, plus some margin. The vibrated beam shall be marked so that the depth of the bottom of the beam can readily be observed.

D. Quality Control Equipment

1. The CONTRACTOR shall provide all equipment necessary for quality control testing. Minimum quality control testing by the CONTRACTOR is specified hereinafter. All equipment shall be

maintained in good working order and shall meet the requirements of the applicable test standards cited herein.

2.03 SLURRY MIX- LMPERMIX®

A. Slurry for the vertical barrier shall meet the following requirements:

1. In-situ hydraulic conductivity shall be less than or equal to $1x10^{7}$ cm/sec.

2. Viscosity at the point of injection shall not be less than 35 marsh funnel seconds in accordance with API RP 138.

3. Minimum slurry temperature shall be 35 degrees F.

4. The unit weight of the slurry as tested on the mud balance shall be in the range of 68 to 75 lbs/ft^3

5. The product shall be sampled and tested at the mixing plant and/or at the slurry nozzles (location to be pre-determined by the CONTRACTOR and OWNER) every 20,000 gallons or twice daily, whichever is greater.

B. The CONTRACTOR shall be responsible for meeting all the above requirements.

1. Completed vertical barrier panels/sections failing to meet these requirements shall be repaired immediately to the satisfaction of the ENGINEER.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Slurry Mixing

1. Produce slurry by gradually adding components to water and thoroughly mixing until complete homogenous slurry is achieved. The resulting slurry shall produce the slurry properties specified herein before introduction to the vertical barrier.

2. All slurry shall be mixing plant mixed.

3. The CONTRACTOR's full-time slurry specialist shall regularly test and control the mixing and placing of the slurry in order to maintain the specified properties of the slurry. The construction quality control plan shall include methods and procedures for mixing the slurry and delivering it to the vertical barrier installation rig.

B. Driving and Slurry Placement

1. The CONTRACTOR is responsible for using the construction staking and control points provided by others.

2. The beam shall be controlled by guide leads ensuring plumbness within 1 percent of vertical. Each insertion shall overlap the previous insertion a minimum of 3 inches, plus the 14-inch fin.

3. The beam shall be inserted to the required depth or refusal by a vibratory driver vibrating at its maximum rate and shall be extracted at a rate suitable for the proper injection of slurry. The pumping pressure of the slurry shall be such as to maintain a full reservoir trench level around the beam during extraction. The impervious layer may be located by the change in slurry pressure as measured by the pressure gauges.

4. The complete slurry wall shall be continuous with no gaps. The slurry wall shall have an average thickness of 4 inches.

5. The CONTRACTOR shall arrange its work activities and constantly take care to avoid spillage or accidental discharge of slurries, water, or other liquids into the wetland areas on the site.

C. Depth of Vertical Barrier

1. Penetration to the depths as shown on the Drawings, or as determined in the field by the ENGINEER, or to refusal - whichever comes first. The actual depth of each drive will be determined by on-site evaluation of available subsurface information, including data obtained during construction of the collection trench and observations of driving resistance.

D. HDPE Embedment

1. The vertical sheets shall be installed at depths as shown on the plans or as directed by the ENGINEER. The CONTRACTOR shall provide the ENGINEER with a suitable means of verifying the plumbness of the installed sheets and determining the depth of the sheet at any time. The equipment shall be carefully checked for plumbness and shall not deviate more than 2 inches per foot from the vertical. Sheeting shall be installed following placement of the slurry material and embedded prior to such material hardening to an extent that prevents HDPE sheet installation.

E. Tolerances

1. Alignment of the cutoff wall shall be within 6 inches of the alignment staked in the field. Request for greater variations shall be submitted to the ENGINEER for review at least 48 hours prior to the installation in the area of the proposed change.

2. The wall shall be plumb within 1% of vertical.

F. Treatment to Top of Vertical Barrier

1. A temporary cover shall be constructed above the vertical barrier, if required, e.g. freezing weather conditions. Construction of the temporary cover or placement of a cloth cover shall begin after the slurry has adequately cured. Material excavated from the reservoir trench and stockpiled along the outside edges of the work platform may be used for the temporary cover. The material shall then be compacted in the reservoir trench to match existing top grade of work platform.

3.02 FIELD QUALITY CONTROL

A. General

1. The CONTRACTOR shall be responsible to ensure that all work is performed to the standards established herein subject to review and inspection of the ENGINEER. All quality control records, routine test observations, and measurements shall be made available for inspection by the ENGINEER. The CONTRACTOR shall bear the cost of all specified field tests.

B. Tests and Frequency -Minimum Requirements

1. Quality control testing shall be performed in accordance with the approved Construction Quality Control Plan. Minimum requirements are specified below.

2. Perform the sampling and control testing as indicated, according to the methods specified subsequently and at the frequencies specified subsequently. Sampling and testing shall be performed by personnel experienced in the type of test required. Samples shall be representative of the overall volume of material from which the sample is taken.

3. Equipment for sampling and testing shall be in good condition. Equipment shall be set up for on-site testing and testing shall be performed on-site, unless otherwise specified or accepted in writing by the ENGINEER. Test results shall become the property of the OWNER. The CONTRACTOR shall be responsible for representative, quality and accurate sampling, and testing. Mathematical calculations shall be checked by someone other than the person performing the original calculations.

Item	Sampling and Testing	Frequency
Slurry-As Mixed	Sampled immediately before entering the trench: Unit Weight Viscosity	Every 20,000 gallons or twice daily (whichever is greater)

Slurry-Lab	Hydraulic conductivity	Every 750 lineal feet of wall installed
Barrier Verticality	Measured with hand level	Each beam insertion

C. Testing Standards

1. Tests shall conform to the following:

Test	Standard
Unit Weight of Slurry	API RP 138
Viscosity, Marsh (seconds)	API RP 13B
Hydraulic Conductivity	ASTM D 5084, after 60 days- modified for low permeability samples

D. Record Keeping

1. The CONTRACTOR shall keep detailed and accurate records of the mixing plant and vertical barrier production during installation of the slurry wall.

   a. Mixing plant record keeping shall include maintaining an accurate record of all slurry ingredients, including any additives used for slurry production, mixing time for each batch, and the volume of slurry produced for each batch.

   b. Production records during driving of the vibrated beam, or equivalent, shall include an accurate record of the total penetration depth of each beam drive, depth of key-in penetration of each beam, a record of the driving pressure, and changes in slurry pressure versus depth for each beam.

   c. Copies of these records shall be provided to the ENGINEER on a daily basis.

E. Wall Continuity and Thickness

1. The CONTRACTOR will maintain a tight quality control program for the penetration of each beam. Adherence to these guidelines will ensure wall continuity. The CONTRACTOR shall also compare the square foot production in relation to the volume of slurry produced to give an average wall thickness for that day.

2. The CONTRACTOR shall help the ENGINEER in any possible way for other tests, as long as this participation does NOT interfere with wall production. The cost of reproducing the wall due to destructive aspects of the testing shall be the OWNER's responsibility.

F. Corrective Action

1. Whenever tests conducted by the CONTRACTOR and/or the ENGINEER indicate material or workmanship are not in accordance with the Contract Documents, work shall be halted and the cause of the discrepancy shall be identified. Work not in accordance with the Contract Documents shall be removed, replaced, or otherwise corrected so as to conform to the Contract Documents. The responsible party for the cost for the corrective action will be decided after the cause of discrepancy has been identified.

G. Quality Assurance

1. The ENGINEER may sample and test independently of the CONTRACTOR. Sampling and testing performed independently by the ENGINEER will be in addition to the specified tests and shall not relieve the CONTRACTOR of any testing responsibilities. These tests are the sole expense of the OWNER.

a. Sampling and testing performed by the CONTRACTOR, work necessary to identify the cause of any nonconformance, and remedial work necessary because of construction not in accordance with the Contract Documents shall be at the CONTRACTOR's expense.

3.03 CLEAN-UP

A. After the completion of the construction operations, all remaining material and slurry shall be removed from the ground surface in the construction area, including the mixing areas. The slurry and remaining materials shall be disposed of within the designated disposal areas encircled by the work platform. The disposal of the slurry and remaining materials will be accomplished by spreading it on the ground. All disking or mixing of the slurry into the existing ground is to be done by others. The ENGINEER shall be the judge of satisfactory clean-up and clean-up shall reasonably be performed until accepted by the ENGINEER.

END OF SECTION

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Appendix Document O
Jet Grouting Specification

PART 1 [1]GENERAL

1.01 DESCRIPTION

A. Scope:

Provide all labor, materials, and equipment necessary for Jet Grouting beneath utilities or pipes where Section 13001 Vibratory Beam Slurry Wall is not accessible. The work consists of installing, monitoring and testing as required to construct the soilcrete stabilization via Jet Grouting Method.

B. Terminology

1. Jet Grouting - Jet Grouting is the process of creating soilcrete in situ with stabilizing fluids or grout mix delivered at high pressure though nozzle(s) at the end of a monitor inserted into a borehole. The soilcrete is created by the erosion of the soil by the high pressure injected grout or fluids. A jet grout column is created by injecting the fluids at high pressure, rotating, and lifting the monitor a constant rate. The soil is eroded and mixed with the fluids or grout and forms cementitous grout column.
2. Soilcrete – the result from binding of the in-situ soils with a cementing agent or grout to form a blend of soils and grout to meet a specific standard of strength or permeability.
3. Monitor – A fluid drill pipe designed to deliver the elements of the Jet Grouting process. The monitor has one or more injection points. The nozzle(s) injects the fluid at high velocity into the soil to mix it with the slurry or grout.
4. Jet Grout Column – A cylindrical mass of soilcrete formed from the Jet grout Process.

1.02 REFERENCES

A. The publications listed form a part of this specification. Each publication shall be the latest revision and addendum issued at the time of the Contract and issue of this specification unless noted otherwise. Except as modified by the requirements specified herein or the details on the drawings, work included in this specification shall conform to the applicable provisions of these publications.

1. API (American Petroleum Institute)
   a. API RP 13A Oil Well Drilling Fluid Materials
   b. API RP 13B Standard Procedure for Testing Drilling Fluid
2. ASTM (American Society for Testing and Materials)

[1] **Section 13005 added in its entirety by Addendum No. 1**

a. ASTM C 138 Test Method for Unit Weight of Concrete

b. ASTM D 422 Particle-Size Analysis of Soils

c. ASTM D 1140 Materials Finer than No. 200 Sieve

d. ASTM D 4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils

e. ASTM D 4380 Density of Bentonite Slurries

f. ASTM D 5084 Hydraulic Conductivity Using a Flexible Wall Permeater

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of this specification.

B. Slurry Mix Design

1. The CONTRACTOR shall submit a mix design for the slurry to be used on this project. The Grout Slurry shall consist of a stable homogeneous mixture of cement/bentonite in water and shall be controlled in accordance with the most current API Recommended Practice 13B-1. The mix design shall be based on laboratory evaluation and/or previous project performance. The mix shall demonstrate the proposed grout column will achieve an in-situ hydraulic conductivity of less than or equal to 1×10^{-7} cm/sec.

C. Construction Work Plan

1. The CONTRACTOR shall submit a construction work plan for approval by the ENGINEER as a part of the Section 13001 Vibratory Beam Slurry Wall plan. The work plan shall include the following items:

a. Jet Grouting Procedure – the method of drilling, jet grouting (i.e. single, double, triple, jet systems). Fluid injection pressure(s), rotational speed and withdraw rate for jet grouting through the soil strata. Also included shall be a detailed description of the spacing, location, depth, and quantity of grout to achieve the specified criteria. Grout hole locations shall be dimensionally referenced to the contract drawings, including the geometry of the finished columns, size and overlap.

b. Equipment - A list of major equipment by type and capacity which shall include capability of jet grout rig and specifications of grout mixing equipment.

c. The plan shall include minimum standards with which to gauge the quality of the work during construction including slurry viscosity, control of penetration depth, and penetration plumbness.

d. The plan shall address the physical properties and manufacturer's stated properties for all permanent materials, including manufacturer's certifications of quality, mill certificates, and gradation test data (if required).

e. The plan shall address how excavations around and beneath utilities and pipes will be performed. Included in the plan will be the methodology for supporting the utilities and pipes within the excavation.

f. The plan shall state the correction procedures which will be employed in the case of substandard results. Quality control records shall be submitted to the ENGINEER on a daily basis. The ENGINEER shall be responsible for distribution of QA data to the QA personnel.

1.04 QUALIFICATIONS

A. The installation of the jet grout columns shall be carried out by a qualified CONTRACTOR experienced in Jet Grouting. A qualified CONTRACTOR is defined as having at least ten years direct experience in jet grouting operations. A qualified CONTRACTOR shall have self-performed not less than five projects of similar scope. The CONTRACTOR will be required to submit evidence that competent personnel are available to carry out the operations specified, that such personnel will be assigned to this project, and that such personnel will have previous experience in Jet Grouting. Documentation of work experience shall be provided by the CONTRACTOR with the bid.

B. A construction and jet grouting specialist(s) provided by the CONTRACTOR, as approved by the ENGINEER, having experience with Jet Grouting shall be used to supervise construction, slurry preparation, and quality control. The specialist(s) shall be at the site of operation at all times that the installation is in process. The knowledge and experience of the specialist(s) should include, but not necessarily be limited to:

1. Mixing methods required to properly mix the slurry required.

2. Construction equipment, materials, testing and quality control- as required for Jet Grouting. The specialist(s) shall control the mixing, composition, placement, cleaning, and maintenance of the slurry. The credentials of the specialist(s) shall be submitted to the ENGINEER for approval 15 calendar days prior to jet grouting construction.

1.05 SITE CONDITIONS

A. The CONTRACTOR is aware of the site conditions at this site.

B. If groundwater level at the site is very shallow, then a work platform will need to be constructed by others prior to the vertical barrier construction. The work platform is needed to provide a stable working surface and increased freeboard height to enhance slurry wall stability. A minimum of 3' of freeboard between the top of the slurry wall and the water table must be obtained. Dewatering may need to be done by others to obtain the minimum of 3'. In creating the working platform, the work shall be performed so as to minimize potential slope instability of the working platform.

C. The proposed alignment may traverse utilities and pipes. The CONTRACTOR shall be prepared to excavate and support utilities and pipes while installing the slurry wall.

D. It is the CONTRACTOR's responsibility to protect his equipment and the elements of the constructed product from adverse effects due to cold weather and freezing, hot weather, and heavy rains causing possible site flooding.

PART 2 PRODUCTS

2.01 MATERIALS

A. Water - Water shall be potable, therefore, clean, fresh, and free from oil, acid, alkali, organic matter, or other deleterious substances..

B. Bentonite - Bentonite used in preparing slurry shall be pulverized (powder or granular) premium grade sodium-cation montmorillonite and shall meet the most current API Standard 13A, Section 4. The yield of the bentonite shall be [90] barrels per ton.

C. Cement - Cement used in preparing grout shall conform to ASTM C150, Portland Type I or II or ASTM C989, Ground Granular Blast Furnace Slag or a mixture of both.

D. Admixtures - For Bentonite Slurry, admixtures of the type used in the control of oil-field drilling slurries such as softening agents, dispersants, retarder or plugging or bridging agents may be added to the water or the slurry to permit efficient use of bentonite and proper workability of the slurry. The ENGINEER shall be advised of all additives used.

2.02 EQUIPMENT

A. General - The jet grout columns shall be constructed using suitable equipment capable of producing a finished product, as specified. All equipment shall be

free of fluid leaks which discharge substances onto the ground. All broken or leaky lines, hoses, valves, pistons, pipes, tanks, and other equipment components shall be immediately repaired or removed. Equipment shall be maintained in such a condition so as to deliver the manufacturer's rated output. If inadequate quality of production is obtained, larger and/or different equipment must be provided by the CONTRACTOR.

B. Grout Mixing Equipment - The slurry shall be mixed in a mixing plant which shall include a high-speed/high shear colloidal mixer, or other equipment that achieves complete dispersion of the components and produces a stable, homogenous grout mix. The plant shall be capable of providing a continuous supply of grout during construction. The necessary pumps, sumps, hoses, valves, supply lines, mixers, and tools shall be provided by the CONTRACTOR.

C. Quality Control Equipment

1. The CONTRACTOR shall provide all equipment necessary for quality control testing. Minimum quality control testing by the CONTRACTOR is specified hereinafter. All equipment shall be maintained in good working order and shall meet the requirements of the applicable test standards cited herein.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. General

1. Jet Grouting may consist of a single jet (grout injection only), double jet (grout air injection, or triple jet (water, air and grout injection) systems. Any of these systems will be acceptable, providing the performance requirements of these Specifications are met.

2. The CONTRACTOR shall familiarize himself with sites, in particular, with location of the above ground utilities (e.g., overhead telephone and power lines) that might affect his operations. Since the jet grout columns will be installed beneath existing utilities and pipes, the jet grout columns shall be installed at an angle to avoid contact with the utilities and pipes.

3. Maintain good control of the jet grouting process in regard to spoil return so as to minimize or eliminate ground heave and uplift pressure on the utilities and pipes.

4. Prevent any and all material from entering storm drains or other drainage courses, or leaving the site via runoff.

5. At all times during and at completion of jet grouting operations, the site shall be thoroughly cleaned of all debris, water, return floe and spilled material.

B. Grout Mixing

1. Produce grout by gradually adding components to water and thoroughly mixing until complete homogenous slurry is achieved. The resulting slurry shall produce the slurry properties specified herein before introduction to the vertical barrier.
2. All slurry shall be mixing plant mixed.
3. The CONTRACTOR's full-time slurry specialist shall regularly test and control the mixing and placing of the slurry in order to maintain the specified properties of the slurry. The construction quality control plan shall include methods and procedures for mixing the slurry and delivering it to the jet grout column.

C. Jet Grouting

1. The CONTRACTOR is responsible for using the construction staking and control points provided by others.
2. Jet grout columns shall be installed at locations beneath utilities and pipes to create a fully grouted zone meeting the performance requirements.
3. Create soilcrete columns by jet grouting process from the bottom to the top of the grout area beneath the utilities and pipes. The bottom and top of the jet grout area is to be determined by the CONTRACTOR, meeting the approval of the ENGINEER.
4. Grouting for an individual jet grout column shall be continuous and without interruption.
5. The CONTRACTOR shall arrange its work activities and constantly take care to avoid spillage or accidental discharge of slurries, water, or other liquids into the wetland areas on the site.

D. Treatment to Top of Vertical Barrier

1. A temporary cover shall be constructed above the vertical barrier, if required, e.g. freezing weather conditions. Construction of the temporary cover or placement of a cloth cover shall begin after the slurry has adequately cured. Material excavated from the reservoir trench and stockpiled along the outside edges of the work platform may be used for the temporary cover. The material shall then be compacted in the reservoir trench to match existing top grade of work platform.

3.02 FIELD QUALITY CONTROL

A. General

1. The CONTRACTOR shall be responsible to ensure that all work is performed to the standards established herein subject to review and inspection of the ENGINEER. All quality control records, routine test observations, and measurements shall be made available for inspection by the ENGINEER. The CONTRACTOR shall bear the cost of all specified field tests.

B. Jet Grouting Operations

1. Monitoring and logging of Jet Grouting operations shall be done by the Field Quality Control Representative.

2. Any jet grout hole lost or damaged as the result of mechanical failure of equipment, inadequacy of grout or water supplies, or improper drilling or injection procedures shall be backfilled with cement grout and replaced by another hole, drilled and injected by the CONTRACTOR at no additional cost to the OWNER.

3. Daily records shall be maintained by the CONTRACTOR and submitted to the OWNER's representative.

4. Ensure continuous spoil return during all Jet Grouting operations. The CONTRACTOR will monitor nearby structures and utilities.

C. Materials

1. Bentonite: Certificate of Compliance with the specification shall be obtained from the manufacturer for each shipment of bentonite delivered to the site.

2. Cement: Certificate of Compliance with the specification shall be obtained from the manufacturer for each shipment of bentonite delivered to the site.

3. Fresh Slurry: A complete series of tests shall be conducted from the mixer or tank containing fresh grout slurry ready for introduction in the trench at least twice per shift

D. Testing

1. Wet Sample Method - Wet samples of the in-situ soilcrete materials shall be obtained with the in-situ sampler. The samples shall be taken prior to the soilcrete being allowed to cure in-situ. The wet samples shall be placed in molds (ASTM D4832) and allowed to cure. Note the location, depth, and column of wet sample. Wet samples will be obtained for every 1,000 lin ft of column formed.

2. Permeability Testing - Flexible wall permeability tests shall be conducted on samples of the backfill to determine compliance with these specifications. The test parameters shall be as follows:

   a. Average Effective Confining Stress = [10] psi.

   b. Hydraulic Gradient = [<30]

3. Equipment for sampling and testing shall be in good condition. Equipment shall be set up for on-site testing and testing shall be performed on-site, unless otherwise specified or accepted in writing by the ENGINEER. Test results shall become the property of the OWNER. The CONTRACTOR shall be responsible for representative, quality and accurate sampling, and testing. Mathematical calculations shall be checked by someone other than the person performing the original calculations.

E. Documentation

1. Results of all tests performed shall be recorded on forms acceptable to the ENGINEER and signed by the Jet Grout Specialist. These forms will be available to the ENGINEER at all times for his inspection. Copies of all quality control documents will be submitted daily to the ENGINEER for his verification.

2. An as-built profile drawing shall be continuously maintained by the CONTRACTOR. The profile shall indicate the extent of treatment at the end of each working day. The daily profile shall be drawn in an electronic format or by hand, as directed by the ENGINEER..

3.03 CLEAN-UP

A. At completion of daily Jet Grouting operations, thoroughly clean site and dispose of all spoil debris, water, and spilled material. After the completion of the construction operations, all remaining material and grout shall be removed from the ground surface in the construction area, including the mixing areas. The grout and remaining materials shall be disposed of within the designated disposal areas encircled by the work platform. The disposal of the grout and remaining materials will be accomplished by spreading it on the ground. All disking or mixing of the grout into the existing ground is to be done by others. The ENGINEER shall be the judge of satisfactory clean-up and clean-up shall reasonably be performed until accepted by the ENGINEER.

END OF SECTION