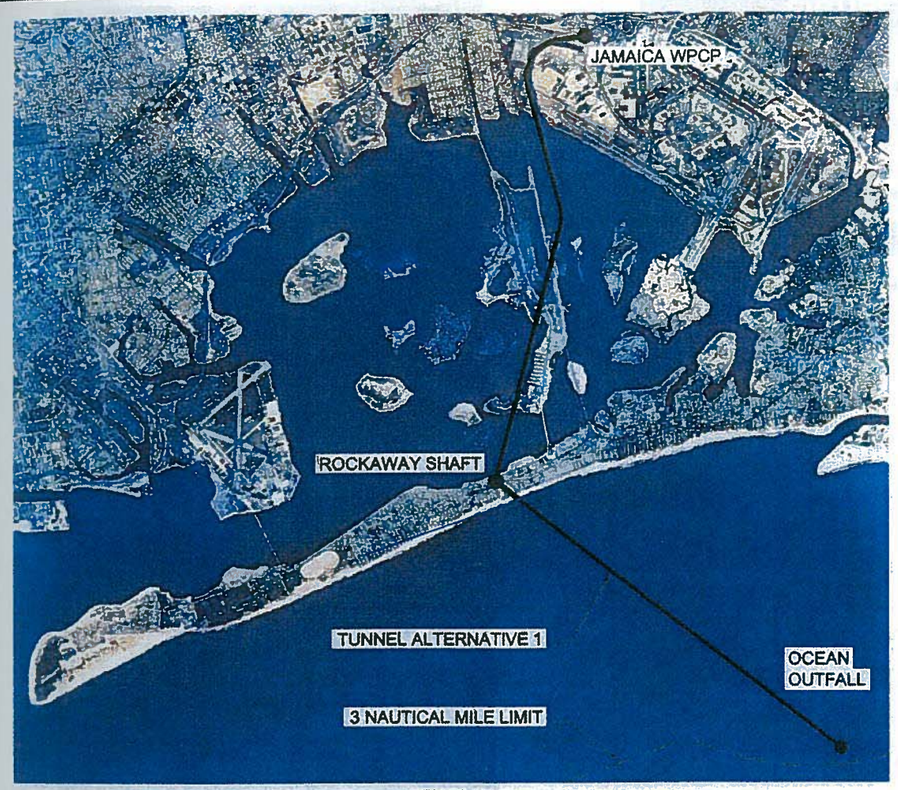
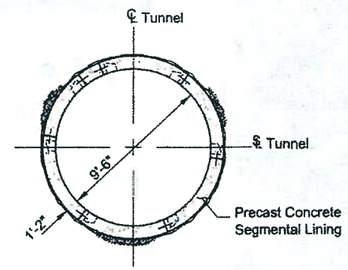
FIGURE 5-1

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
N.T.S.



SECTION A-A
(Typical Outfall Tunnel Section)
N.T.S.

	Length (Mi.)	Q (mgd)	1A-1 I.D.	1A-2 I.D.	1A-3 I.D.
Jamaica WPCP Shaft to Rockaway Shaft	6.16	250	9'-6"	9'-6"	9'-6"
Rockaway Shaft to Ocean Outfall Shaft	5.10	250	9'-6"	9'-6"	9'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"
Ocean Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"
Rockaway Construction Shaft	-	-	35'-0"	35'-0"	35'-0"

ALTERNATIVE 1 - JAMAICA WPCP TO OCEAN OUTFALL

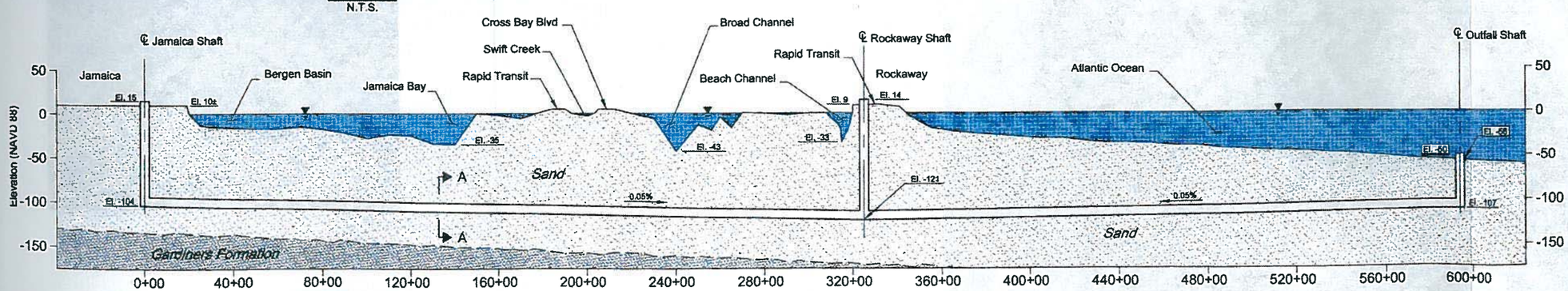


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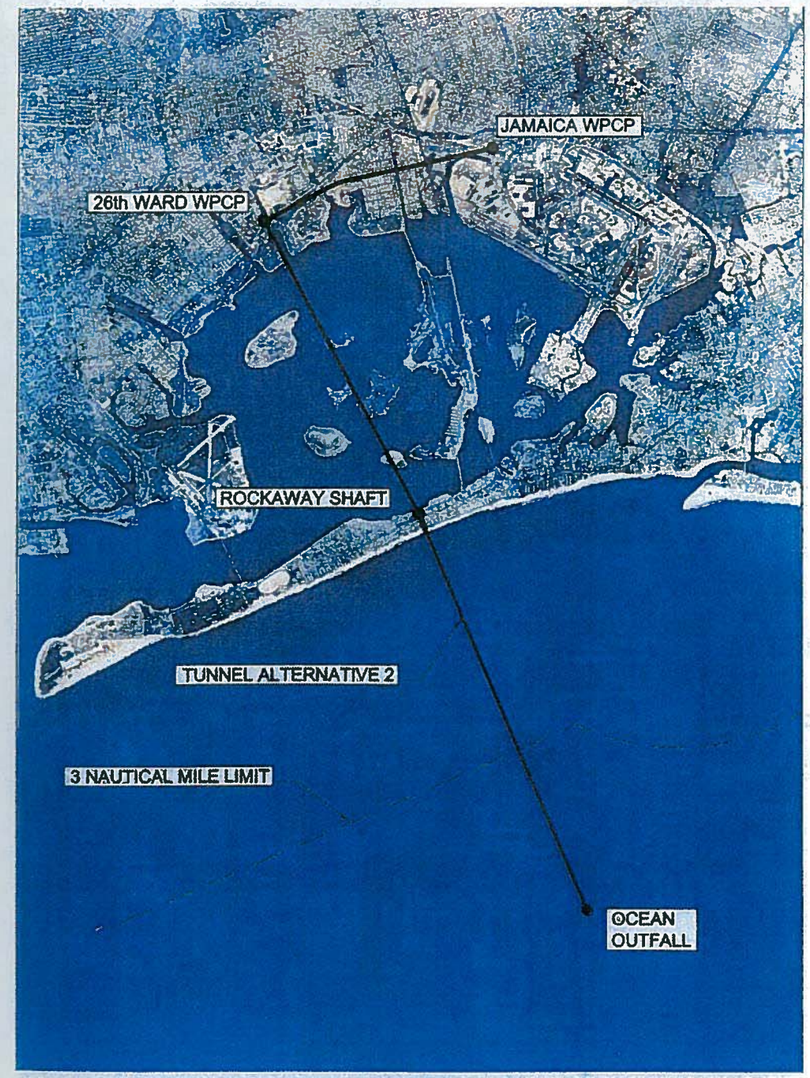
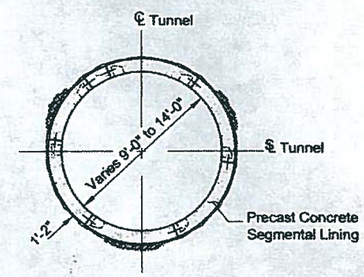
FIGURE 5-2

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	2A-1 I.D.	2A-2 I.D.	2A-3 I.D.	2B I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	250	9'-0"	9'-0"	9'-0"	9'-0"
26th Ward WPCP Shaft to Rockaway Shaft	4.91	470	14'-0"	14'-0"	14'-0"	14'-0"
Rockaway Shaft to Ocean Outfall Shaft	6.44	470	14'-0"	14'-0"	14'-0"	14'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
26th Ward Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"
Ocean Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
Rockaway Construction Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"



SECTION A-A & B-B
(Typical Outfall Tunnel Section)
N.T.S.

ALTERNATIVE 2 - JAMAICA AND 26TH WARD WPCP TO OCEAN OUTFALL

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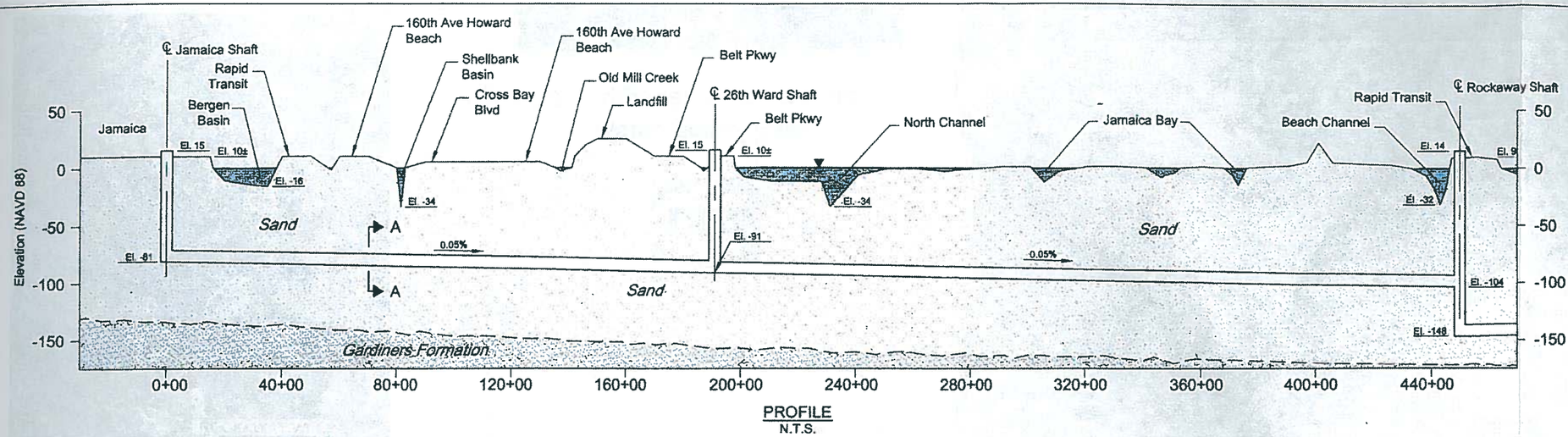

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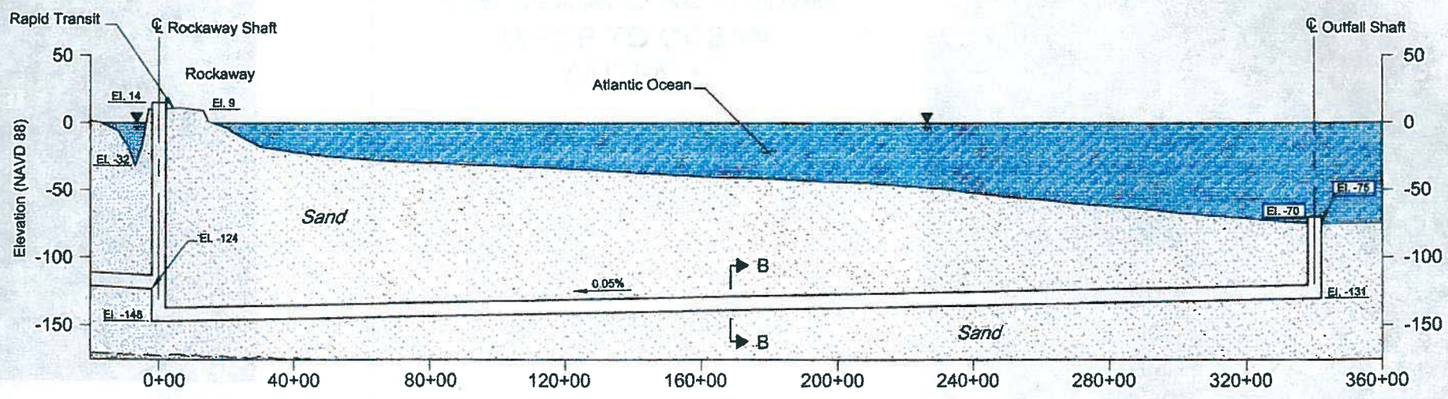

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M_Mac_Reports_TWS/krh/TWS.rpt/NYCDEP/1006/Figure5-2A.indd

FIGURE 5-2A

Comprehensive Jamaica Bay Water Quality Plan

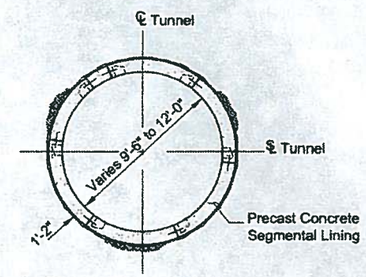
ALTERNATIVE 2 - JAMAICA AND 26TH WARD WPCP TO OCEAN OUTFALL

FIGURE 5-3

Comprehensive Jamaica Bay Water Quality Plan

KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	3A-1 I.D.	3A-2 I.D.	3A-3 I.D.	3B I.D.
Jamaica WPCP Shaft to Rockaway WPCP Shaft	6.16	250	9'-6"	9'-6"	9'-6"	9'-6"
Rockaway WPCP Shaft to Ocean Outfall Shaft	5.40	340	12'-0"	12'-0"	12'-0"	12'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
Rockaway Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"
Ocean Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"



SECTION A-A & B-B
(Typical Outfall Tunnel Section)
N.T.S.

ALTERNATIVE 3 - JAMAICA AND ROCKAWAY WPCP TO OCEAN OUTFALL

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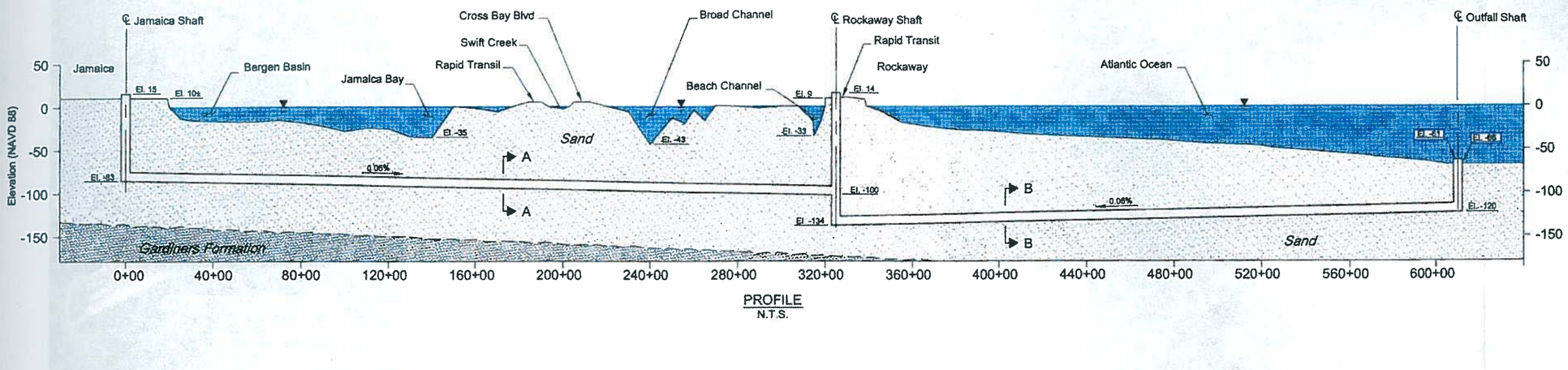

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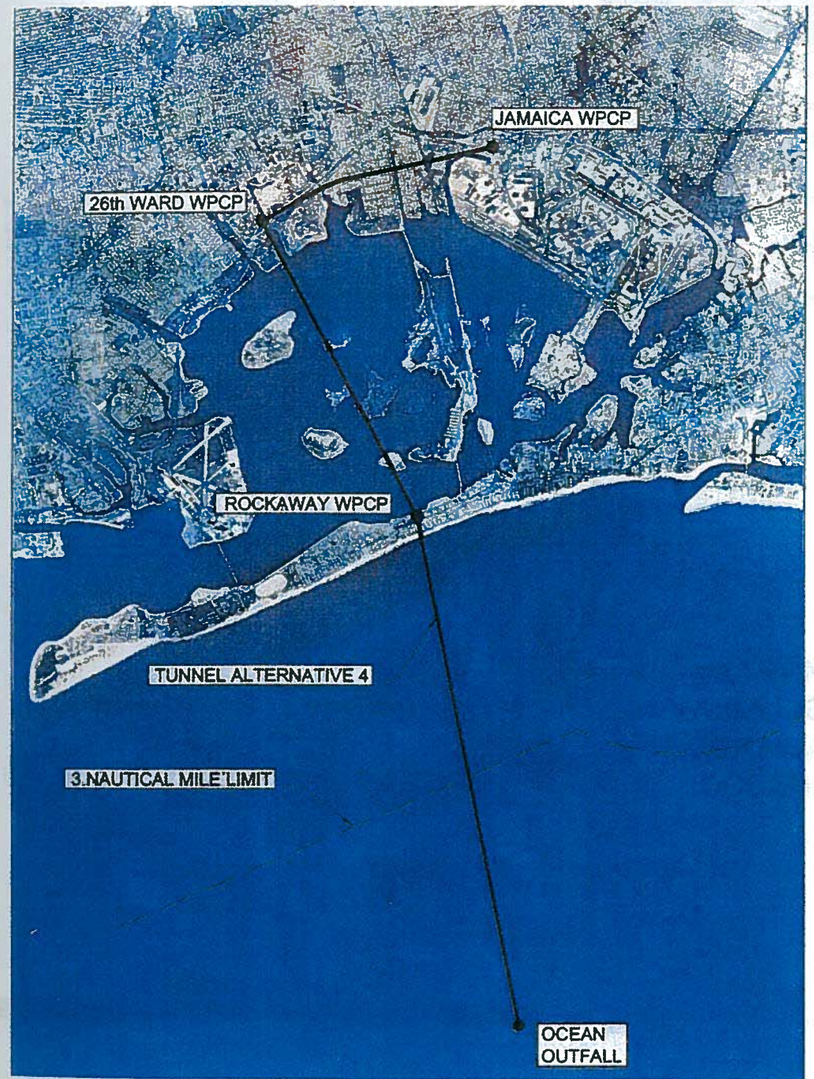
FIGURE 5-3A

Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 3 - JAMAICA AND ROCKAWAY WPCP TO OCEAN OUTFALL

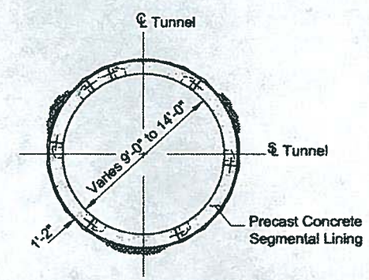
FIGURE 5-4

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	4A-1 I.D.	4A-2 I.D.	4A-3 I.D.	4B I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	250	9'-0"	9'-0"	9'-0"	9'-0"
26th Ward WPCP Shaft to Rockaway WPCP Shaft	4.91	470	14'-0"	14'-0"	14'-0"	14'-6"
Rockaway WPCP Shaft to Ocean Outfall Shaft	7.67	560	15'-6"	15'-6"	15'-6"	16'-0"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
26th Ward Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"
Rockaway Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"
Ocean Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"



SECTION A-A THROUGH C-C
(Typical Outfall Tunnel Section)
N.T.S.

ALTERNATIVE 4 - JAMAICA, 26TH WARD, AND ROCKAWAY WPCP TO OCEAN OUTFALL

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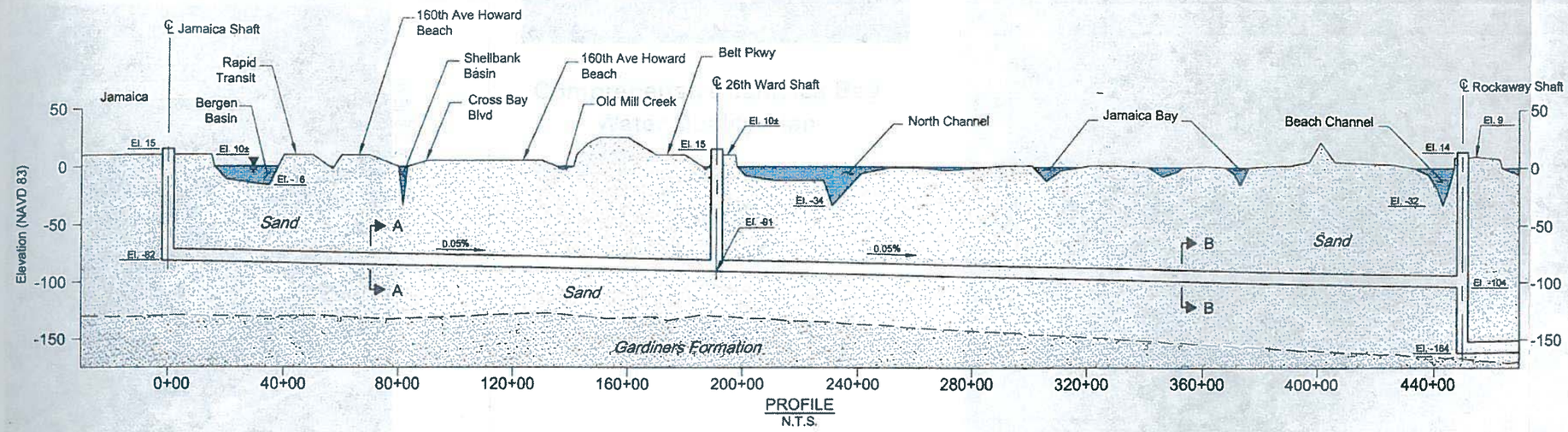


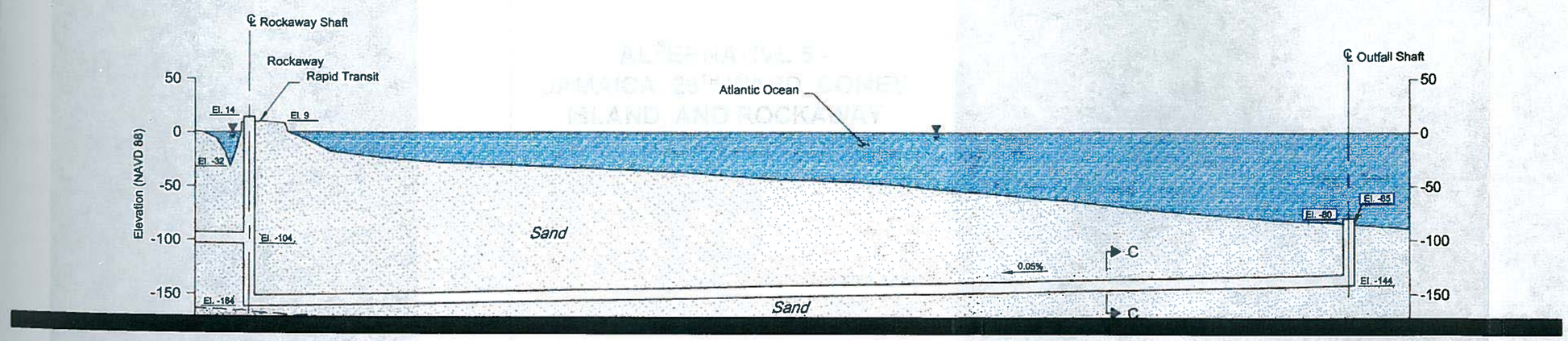


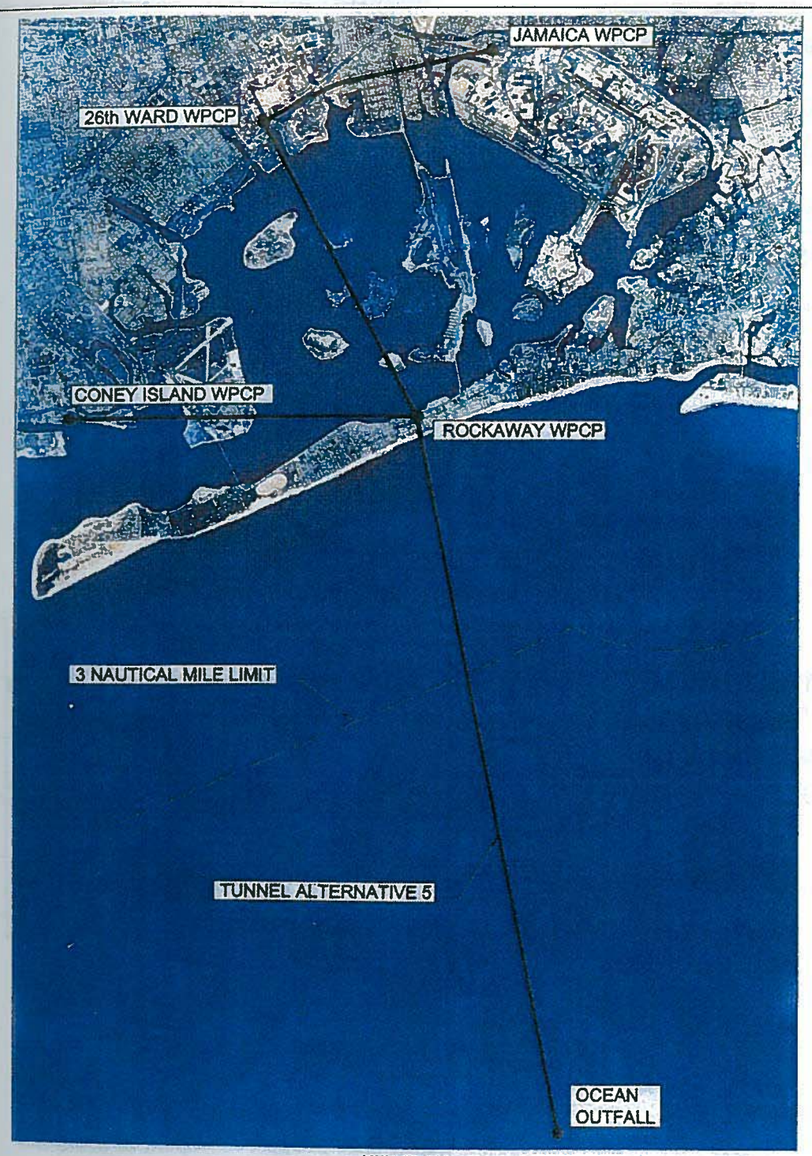
FIGURE 5-4A

Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 4 - JAMAICA, 26TH WARD, AND ROCKAWAY WPCP TO OCEAN OUTFALL

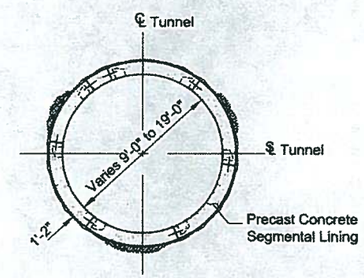
FIGURE 5-5

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	5A-1 I.D.	5A-2 I.D.	5A-3 I.D.	5B I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	250	9'-0"	9'-0"	9'-0"	9'-0"
26th Ward WPCP Shaft to Rockaway WPCP Shaft	4.91	470	14'-6"	14'-6"	14'-6"	15'-0"
Coney Island WPCP Shaft to Rockaway WPCP Shaft	5.27	220	9'-6"	9'-6"	9'-6"	9'-6"
Rockaway WPCP Shaft to Ocean Outfall Shaft	10.89	780	19'-0"	19'-0"	19'-0"	19'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
26th Ward Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"
Rockaway Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"
Ocean Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
Coney Island Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"



SECTION A-A THROUGH D-D
(Typical Outfall Tunnel Section)
N.T.S.

ALTERNATIVE 5 - JAMAICA, 26TH WARD, CONEY ISLAND, AND ROCKAWAY WPCP TO OCEAN OUTFALL

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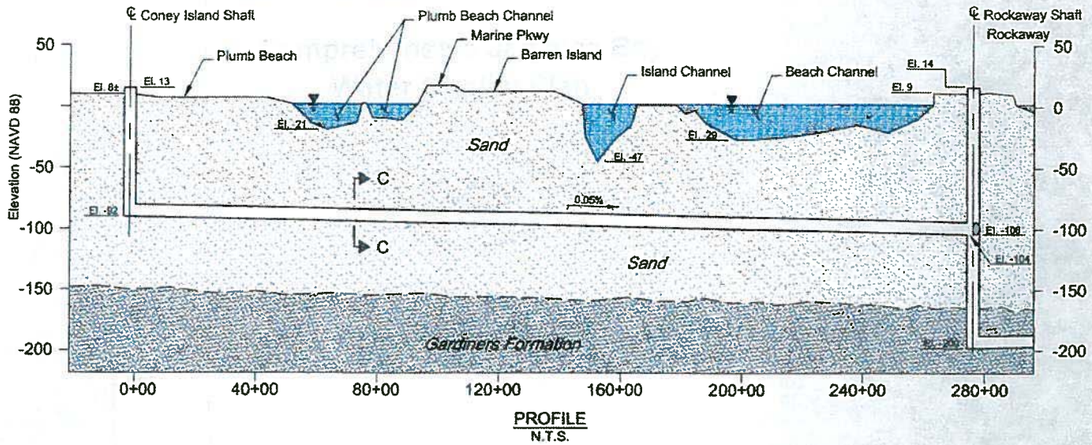

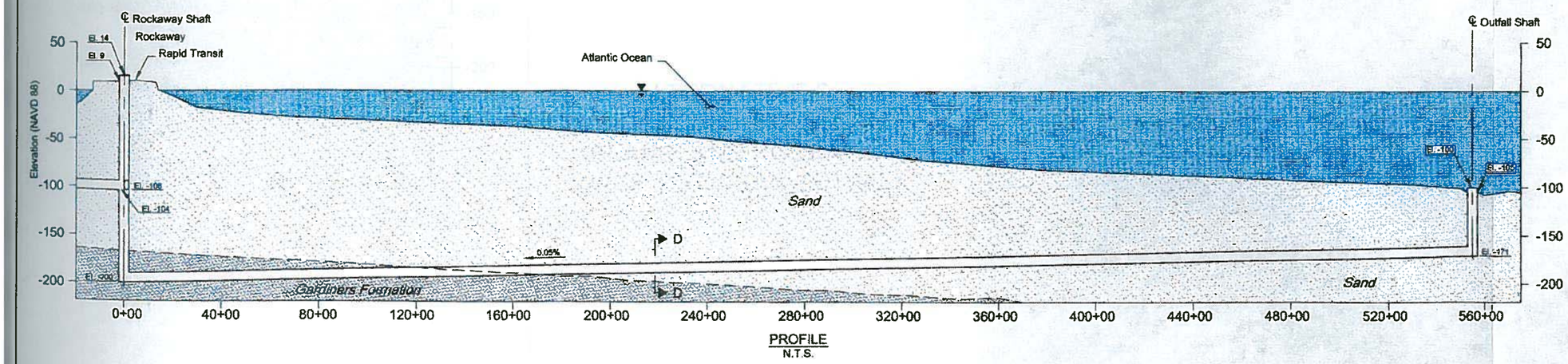

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FIGURE 5-5A

Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 5 - JAMAICA, 26TH WARD, CONEY ISLAND, AND ROCKAWAY WPCP TO OCEAN OUTFALL

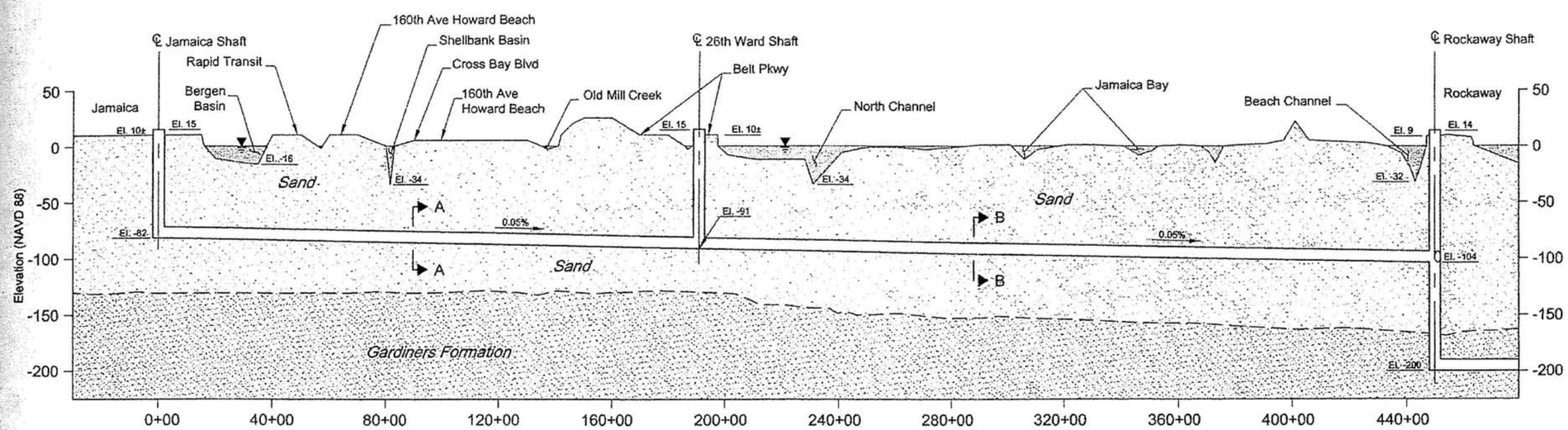

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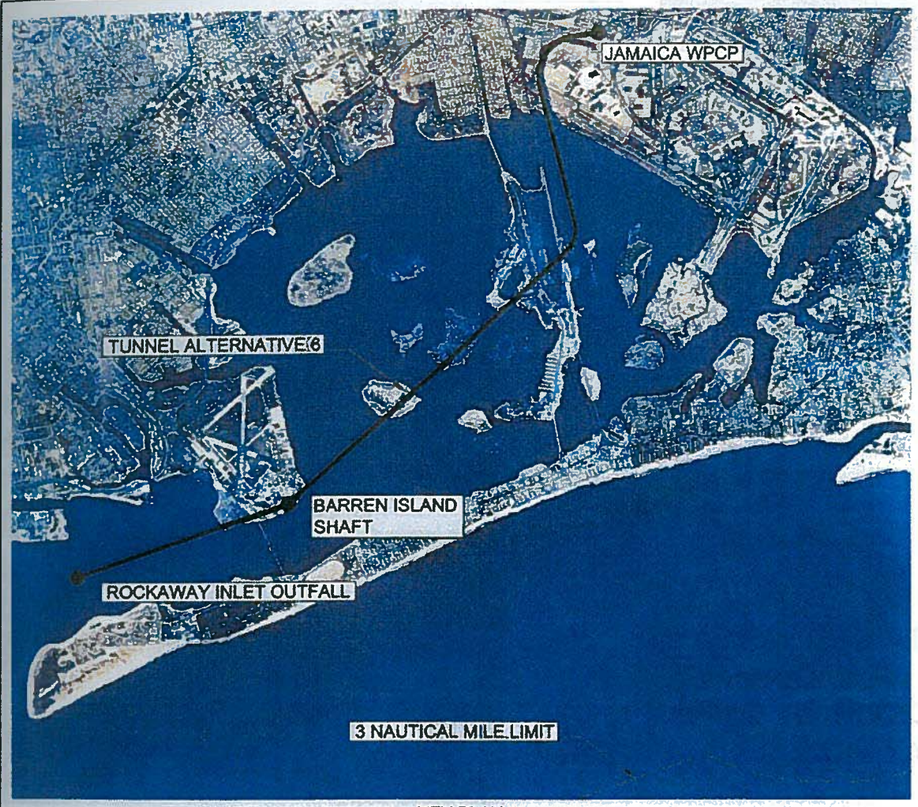
FIGURE 5-5B

Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 5 - JAMAICA, 26TH WARD, CONEY ISLAND, AND ROCKAWAY WPCP TO OCEAN OUTFALL

FIGURE 5-6

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
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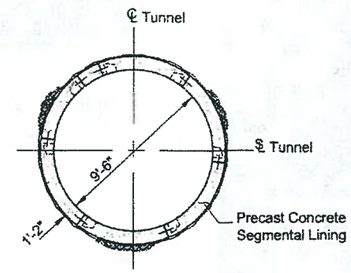
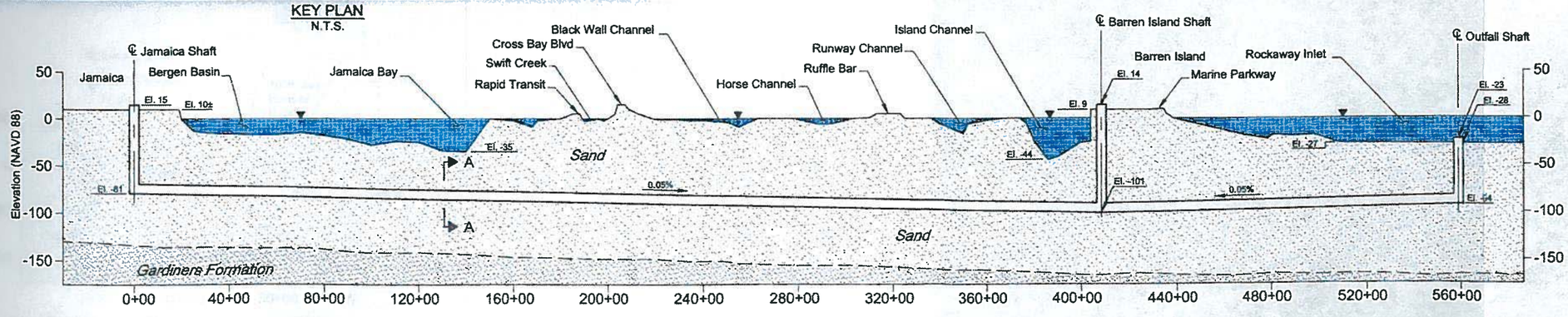


SECTION A-A
(Typical Outfall Tunnel Section)
N.T.S.

	Length (Mi.)	Q (mgd)	6A-1 I.D.	6A-2 I.D.	6A-3 I.D.
Jamaica WPCP Shaft to Barren Island Shaft	7.74	250	9'-6"	9'-6"	9'-6"
Barren Island Shaft to Rockaway Inlet Outfall	2.85	250	9'-6"	9'-6"	9'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"
Rockaway Inlet Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"
Barren Island Construction Shaft	-	-	35'-0"	35'-0"	35'-0"



PROFILE
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ALTERNATIVE 6 - JAMAICA WPCP TO ROCKAWAY INLET OUTFALL

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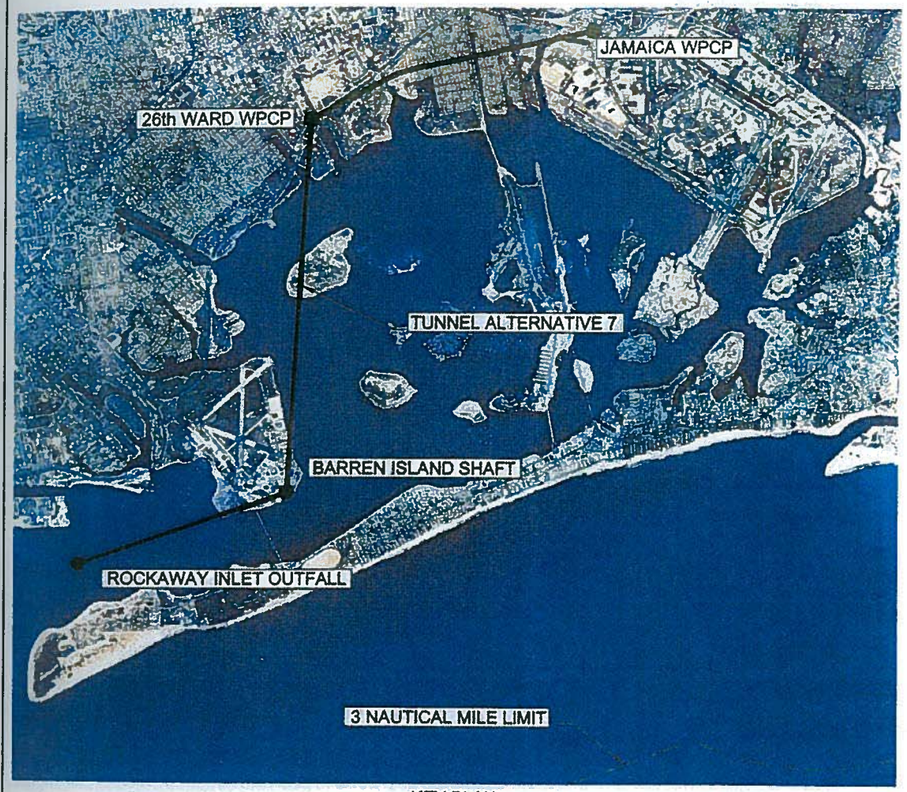
FIGURE 5-7

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
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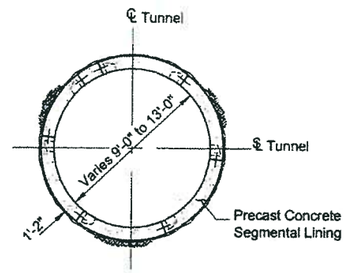
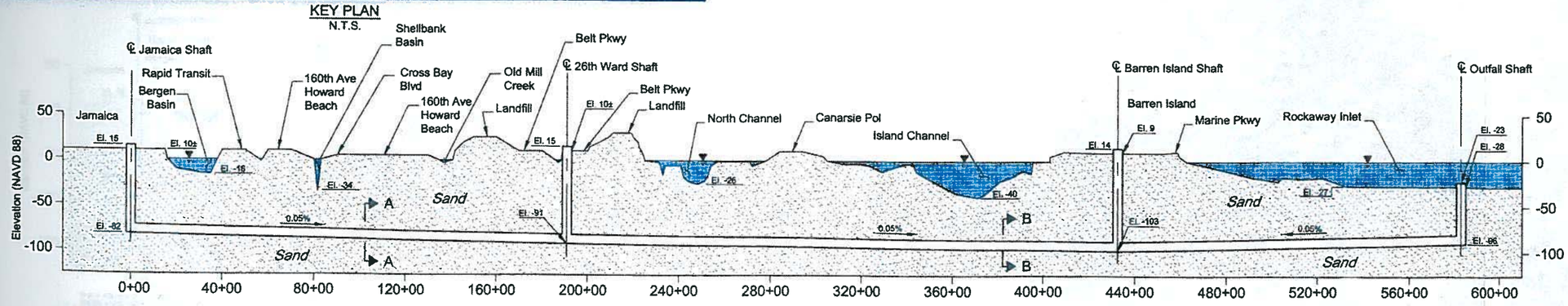


SECTION A-A & B-B
(Typical Outfall Tunnel Section)
N.T.S.

	Length (Mi.)	Q (mgd)	7A-1 I.D.	7A-2 I.D.	7A-3 I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	250	9'-0"	9'-0"	9'-6"
26th Ward WPCP Shaft to Barren Island Shaft	4.57	470	12'-6"	12'-6"	13'-0"
Barren Island Shaft to Rockaway Inlet Outfall Shaft	2.85	470	13'-0"	13'-0"	13'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"
26th Ward Shaft	-	-	35'-0"	35'-0"	35'-0"
Rockaway Inlet Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"
Barren Island Construction Shaft	-	-	35'-0"	35'-0"	35'-0"



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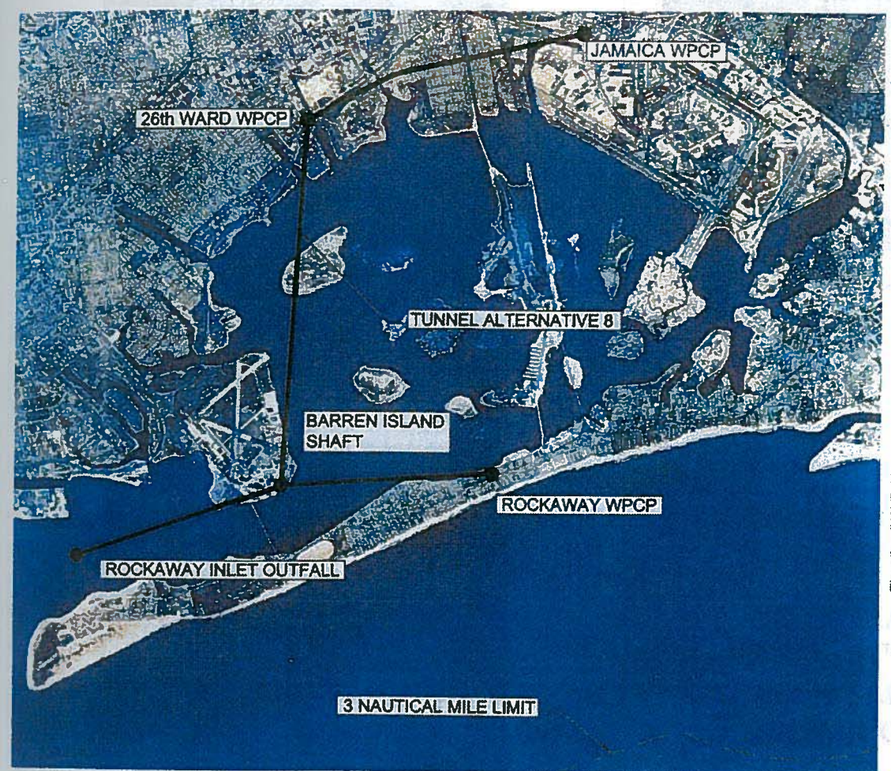
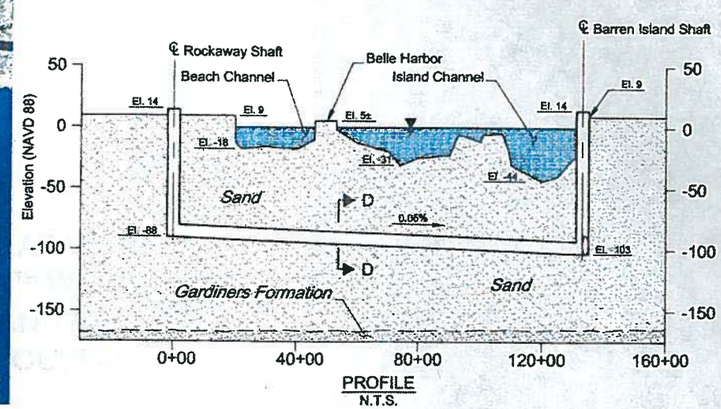
ALTERNATIVE 7 - JAMAICA AND 26TH WARD WPCP TO ROCKAWAY INLET OUTFALL

FIGURE 5-8

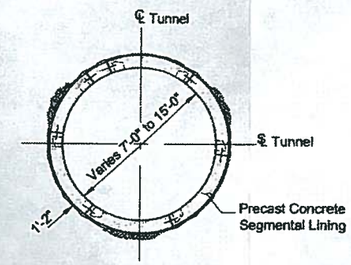
Comprehensive Jamaica Bay Water Quality Plan



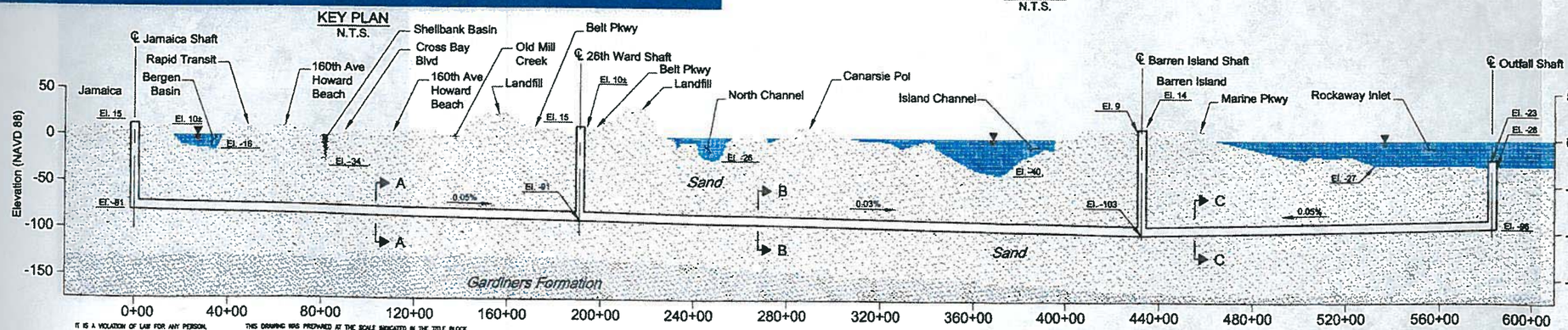
	Length (Mi.)	Q (mgd)	8A-1 I.D.	8A-2 I.D.	8A-3 I.D.	8B I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	250	9'-0"	9'-0"	9'-0"	9'-0"
26th Ward WPCP Shaft to Barren Island Shaft	4.57	470	12'-6"	12'-6"	12'-6"	12'-6"
Rockaway WPCP Shaft to Barren Island Shaft	2.52	90	7'-0"	7'-0"	7'-0"	7'-6"
Barren Island Shaft to Rockaway Inlet Outfall Shaft	2.85	560	15'-0"	15'-0"	15'-0"	15'-6"
Jamaica Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
26th Ward Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
Rockaway Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
Rockaway Inlet Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"	20'-0"
Barren Island Construction Shaft	-	-	35'-0"	35'-0"	35'-0"	35'-0"



PROFILE
N.T.S.



SECTION A-A THROUGH D-D
(Typical Outfall Tunnel Section)
N.T.S.



PROFILE
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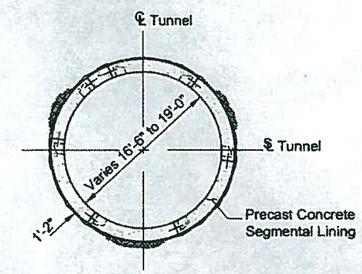
ALTERNATIVE 8 - JAMAICA, 26TH WARD, AND ROCKAWAY WPCP TO ROCKAWAY INLET OUTFALL

KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	9A-1 I.D.	9A-2 I.D.	9A-3 I.D.
26th Ward WPCP Shaft to Rockaway WPCP Shaft	4.91	690	16'-6"	19'-0"	19'-0"
Rockaway WPCP Shaft to Ocean Outfall Shaft	10.89	690	16'-6"	19'-0"	19'-0"
26th Ward Shaft	-	-	35'-0"	35'-0"	35'-0"
Rockaway Shaft	-	-	35'-0"	35'-0"	35'-0"
Outfall Shaft	-	-	20'-0"	20'-0"	20'-0"



SECTION A-A THROUGH B-B
(Typical Outfall Tunnel Section)
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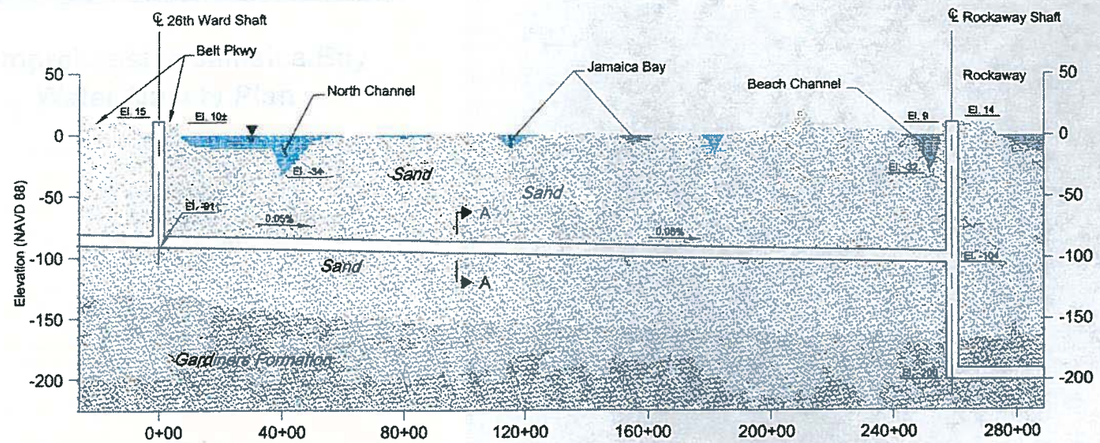
FIGURE 5-9

Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 9 - JAMAICA, 26TH WARD, AND CONEY ISLAND WPCP TO OCEAN OUTFALL

FIGURE 5-9A

Comprehensive Jamaica Bay Water Quality Plan



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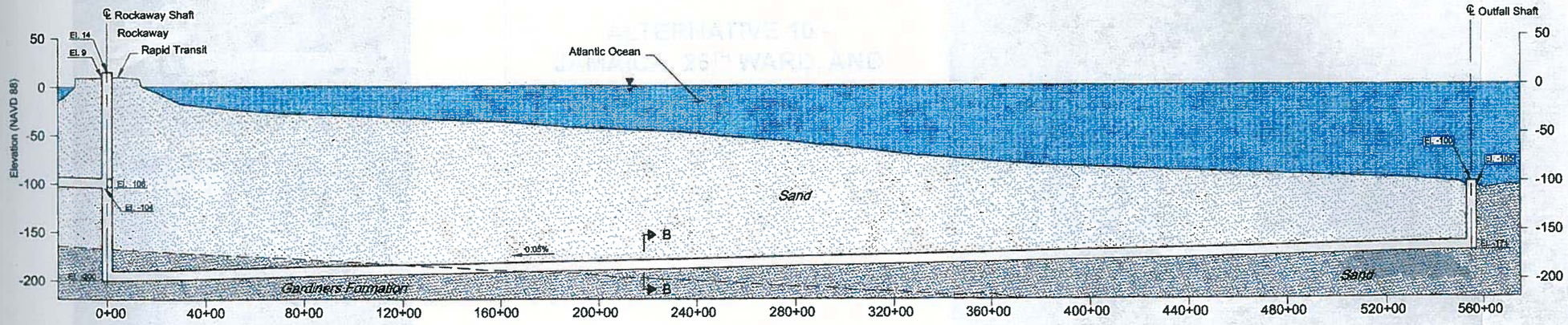

PROFILE
N.T.S.

ALTERNATIVE 9 - JAMAICA, 26TH WARD, AND CONEY ISLAND WPCP TO OCEAN OUTFALL

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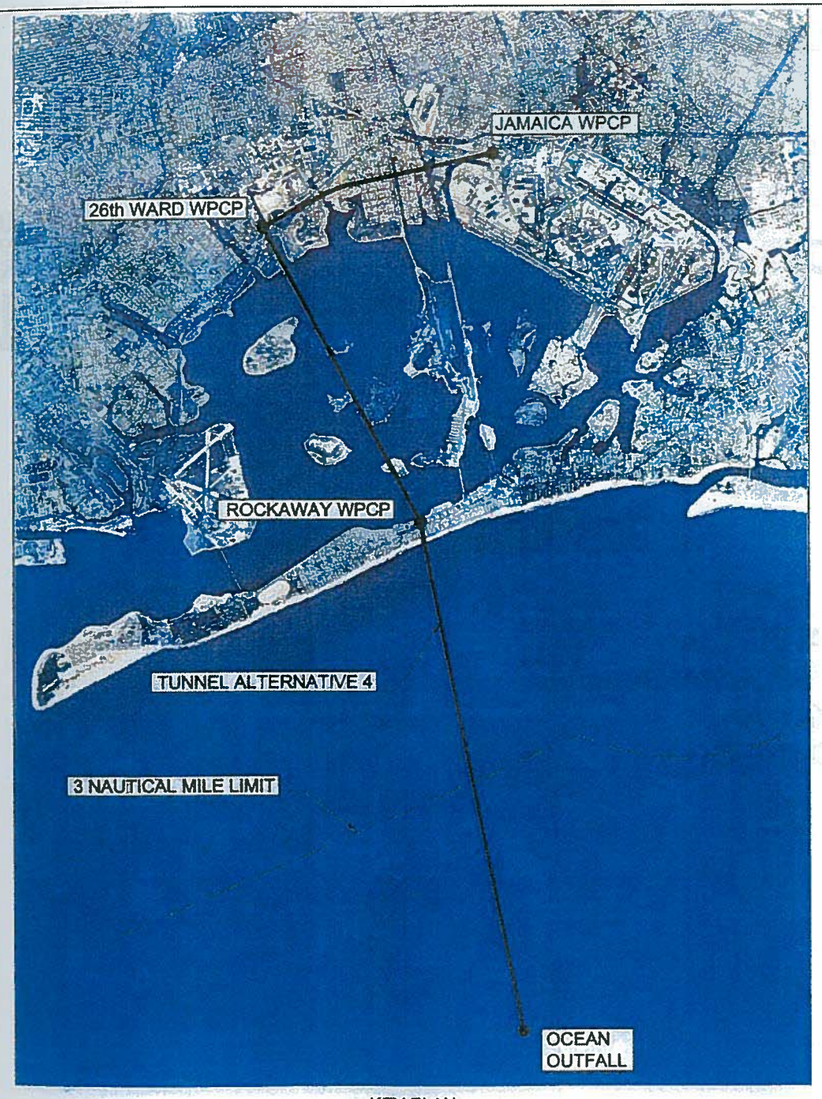
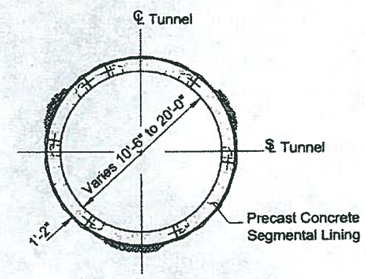
FIGURE 5-10

Comprehensive Jamaica Bay Water Quality Plan



KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	150	10'-6"
26th Ward WPCP Shaft to Rockaway WPCP Shaft	4.91	278	18'-6"
Rockaway WPCP Shaft to Ocean Outfall Shaft	7.61	346	20'-0"
Jamaica Shaft	-	-	20'-0"
26th Ward Shaft	-	-	35'-0"
Rockaway Shaft	-	-	35'-0"
Ocean Outfall Shaft	-	-	20'-0"



SECTION A-A THROUGH C-C
(Typical Outfall Tunnel Section)
N.T.S.

ALTERNATIVE 10 - JAMAICA, 26TH WARD, AND ROCKAWAY WPCP TO OCEAN OUTFALL

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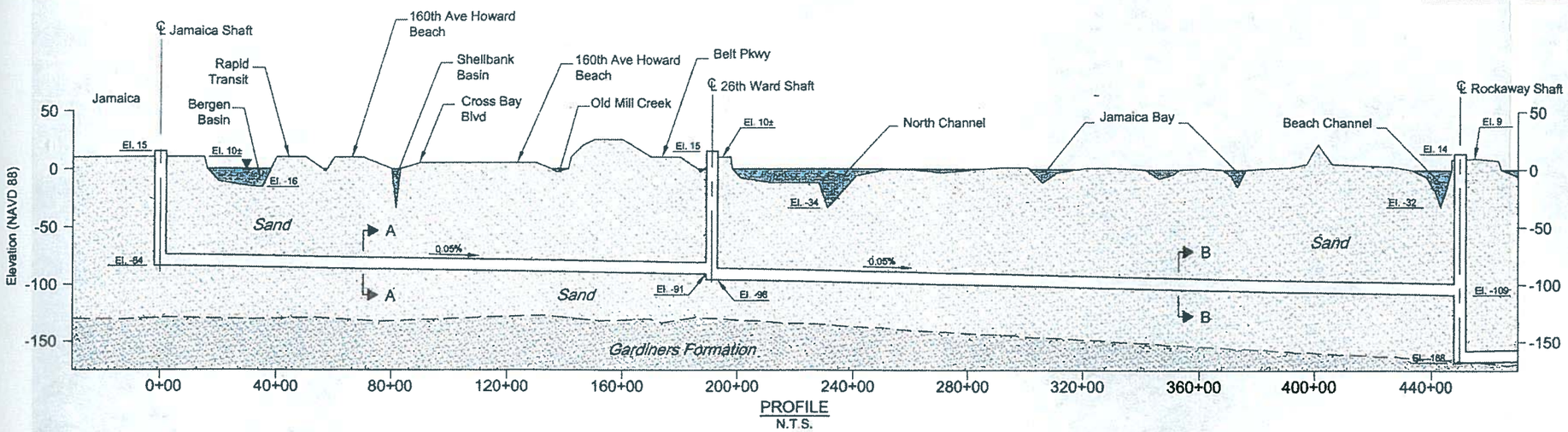
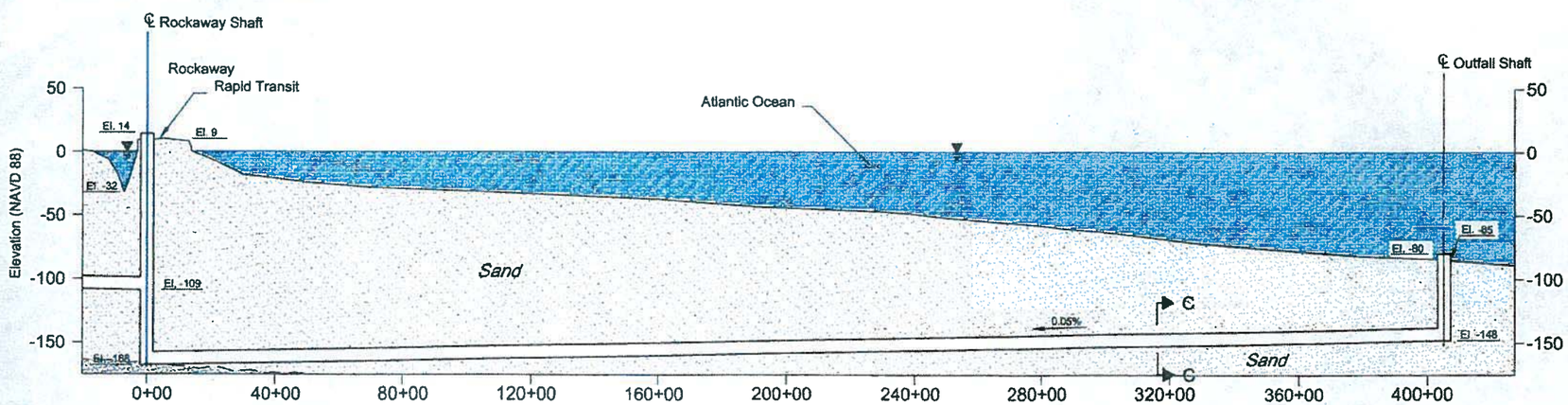


PROFILE
N.T.S.



PROFILE
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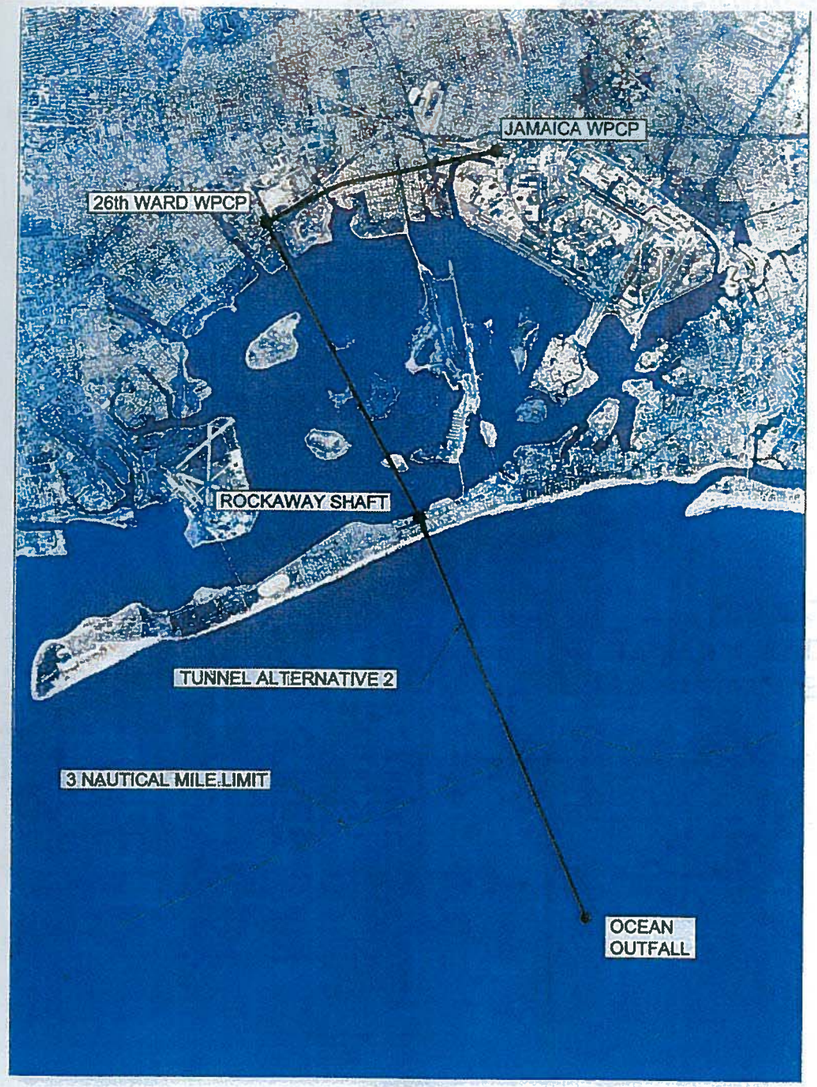
FIGURE 5-10A

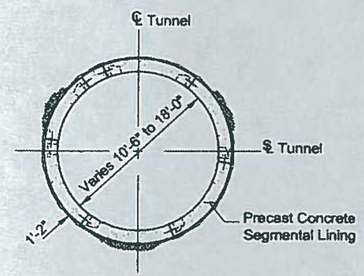
Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 10 - JAMAICA, 26TH WARD, AND ROCKAWAY WPCP TO OCEAN OUTFALL



KEY PLAN
N.T.S.

	Length (Mi.)	Q (mgd)	I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	150	10'-6"
26th Ward WPCP Shaft to Rockaway Shaft	4.91	278	18'-0"
Rockaway Shaft to Ocean Outfall Shaft	6.32	278	18'-0"
Jamaica Shaft	-	-	20'-0"
26th Ward Shaft	-	-	35'-0"
Outfall Shaft	-	-	20'-0"
Rockaway Construction Shaft	-	-	35'-0"



SECTION A-A & B-B
(Typical Outfall Tunnel Section)
N.T.S.

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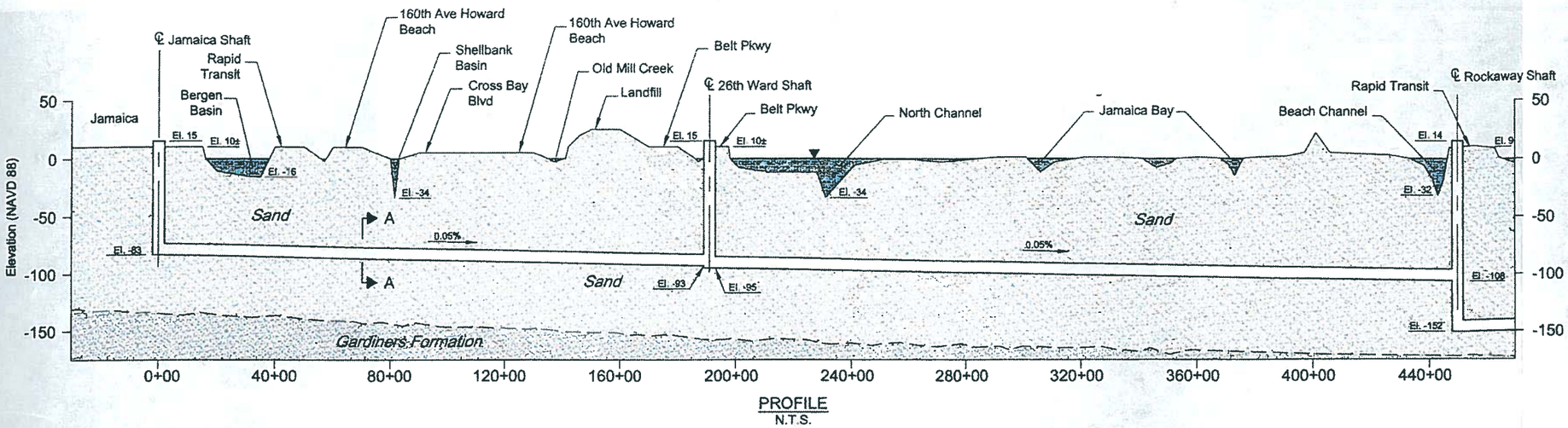
FIGURE 5-11

Comprehensive Jamaica Bay Water Quality Plan

ALTERNATIVE 11 - JAMAICA AND 26TH WARD WPCP TO OCEAN OUTFALL



PROFILE
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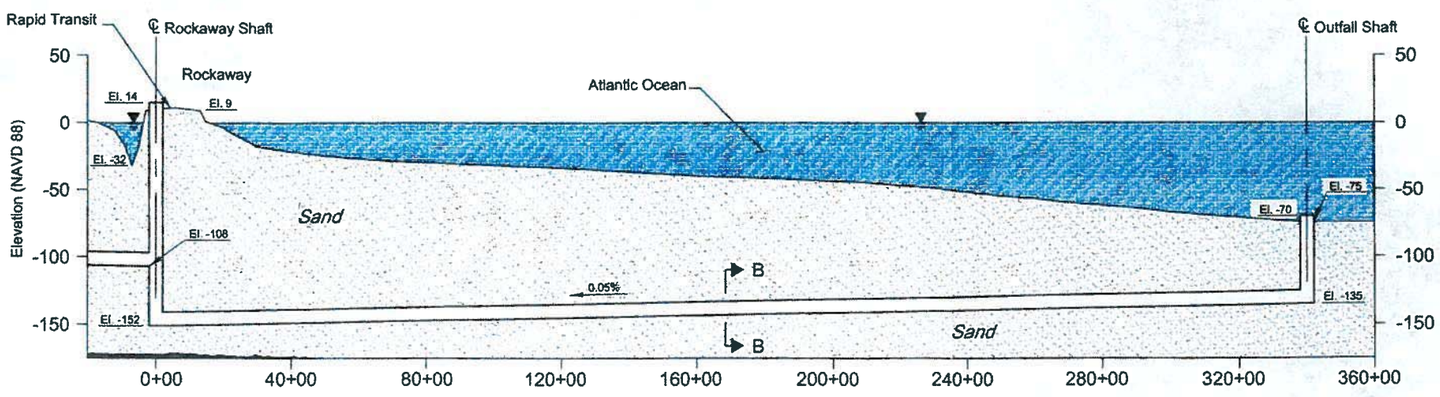

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M_Mac_Reports_TWS/krh/TWS.rpt/NYCDEP/1006/Figure5-11A.indd

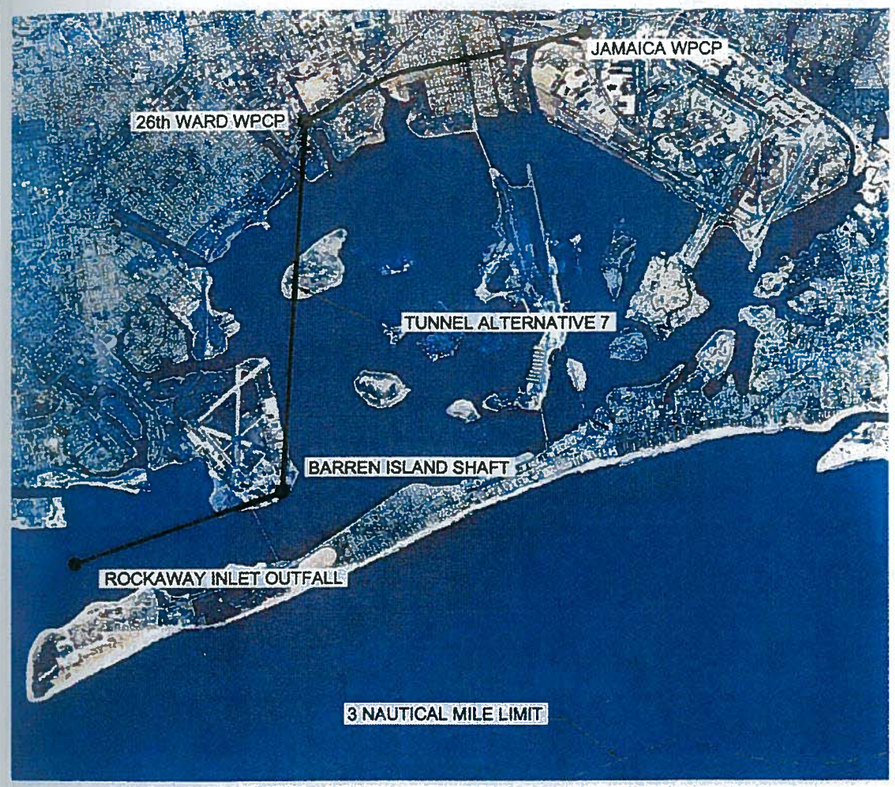
FIGURE 5-11A

Comprehensive Jamaica Bay Water Quality Plan

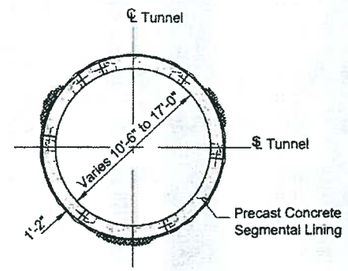
ALTERNATIVE 11 - JAMAICA AND 26TH WARD WPCP TO OCEAN OUTFALL

FIGURE 5-12

Comprehensive Jamaica Bay Water Quality Plan

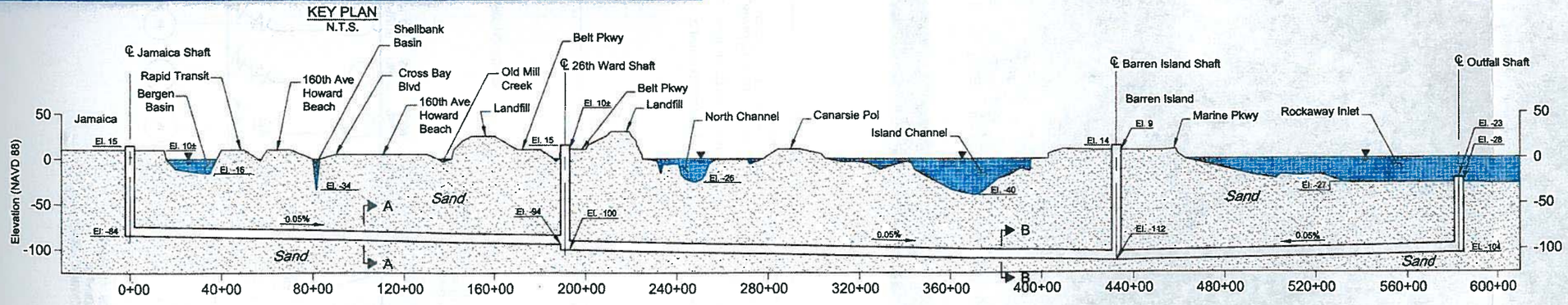


KEY PLAN
N.T.S.



SECTION A-A & B-B
(Typical Outfall Tunnel Section)
N.T.S.

	Length (Mi.)	Q (mgd)	I.D.
Jamaica WPCP Shaft to 26th Ward WPCP Shaft	3.62	150	10'-6"
26th Ward WPCP Shaft to Barren Island Shaft	4.53	278	17'-0"
Barren Island Shaft to Rockaway Inlet Outfall Shaft	2.86	278	17'-0"
Jamaica Shaft	-	-	20'-0"
26th Ward Shaft	-	-	35'-0"
Rockaway Inlet Outfall Shaft	-	-	20'-0"
Barren Island Construction Shaft	-	-	35'-0"



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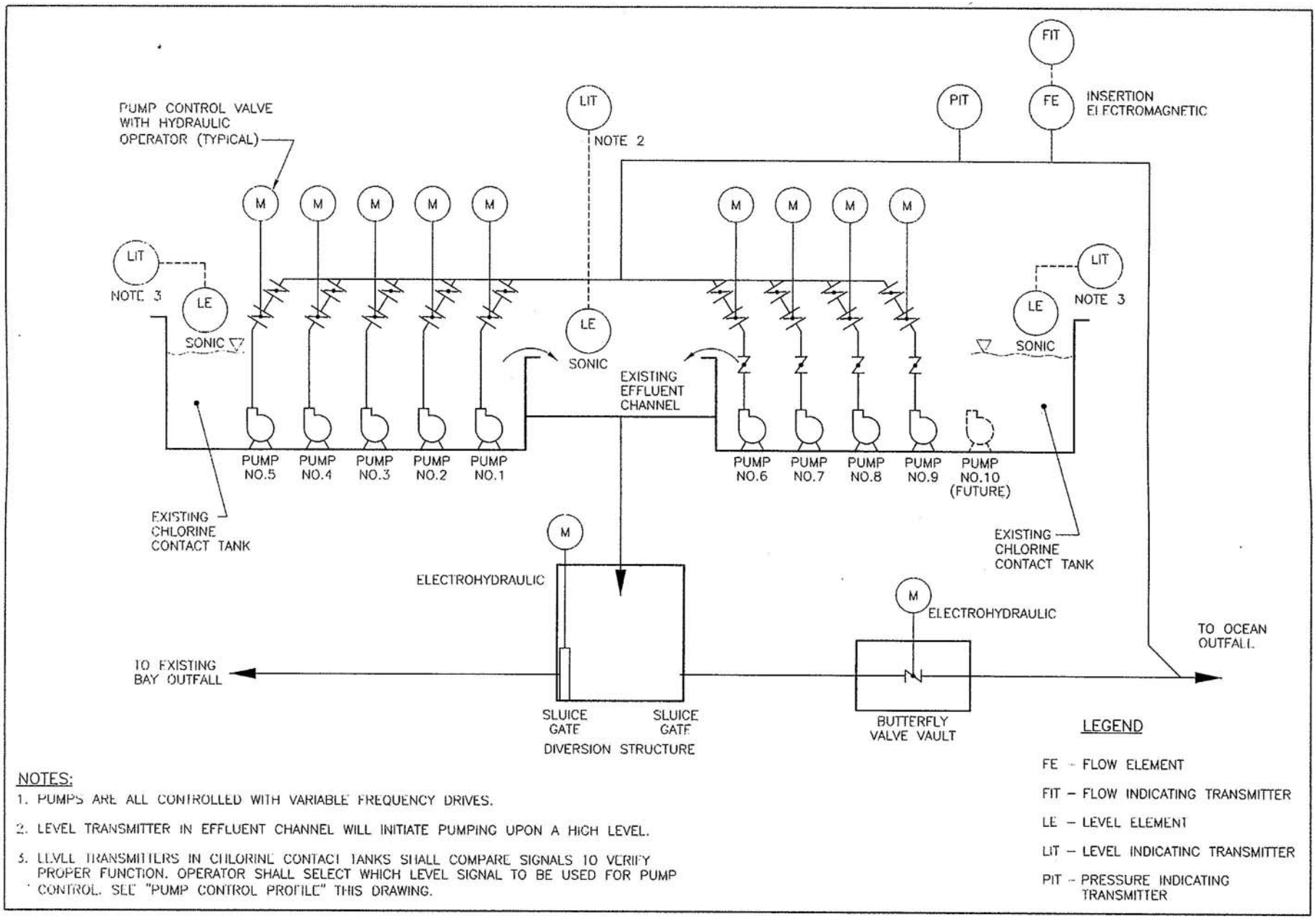
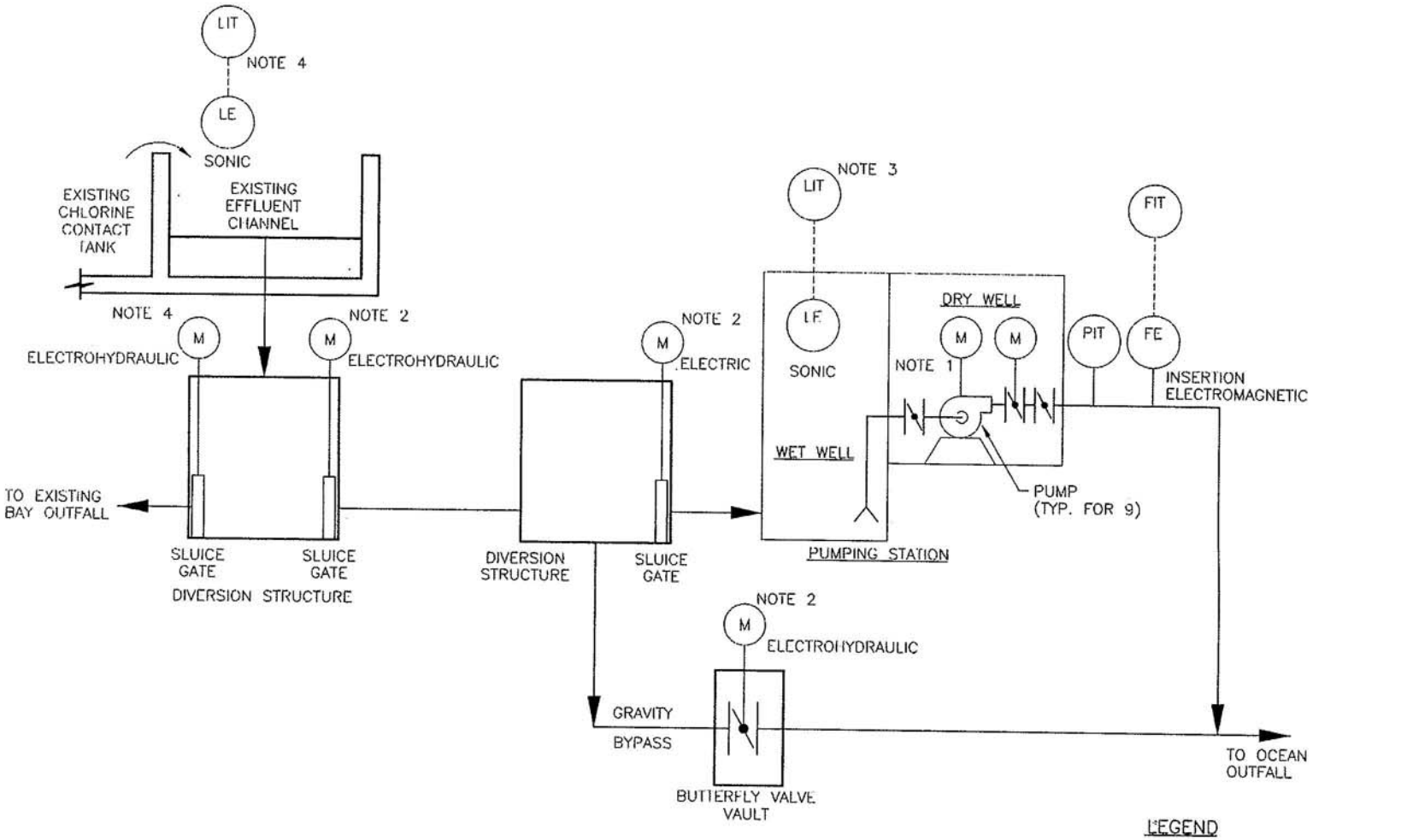
PROFILE
N.T.S.

ALTERNATIVE 12 - JAMAICA AND 26TH WARD WPCP TO ROCKAWAY INLET OUTFALL



CCT MOUNTED SUBMERSIBLE PUMPS
PROCESS FLOW DIAGRAM



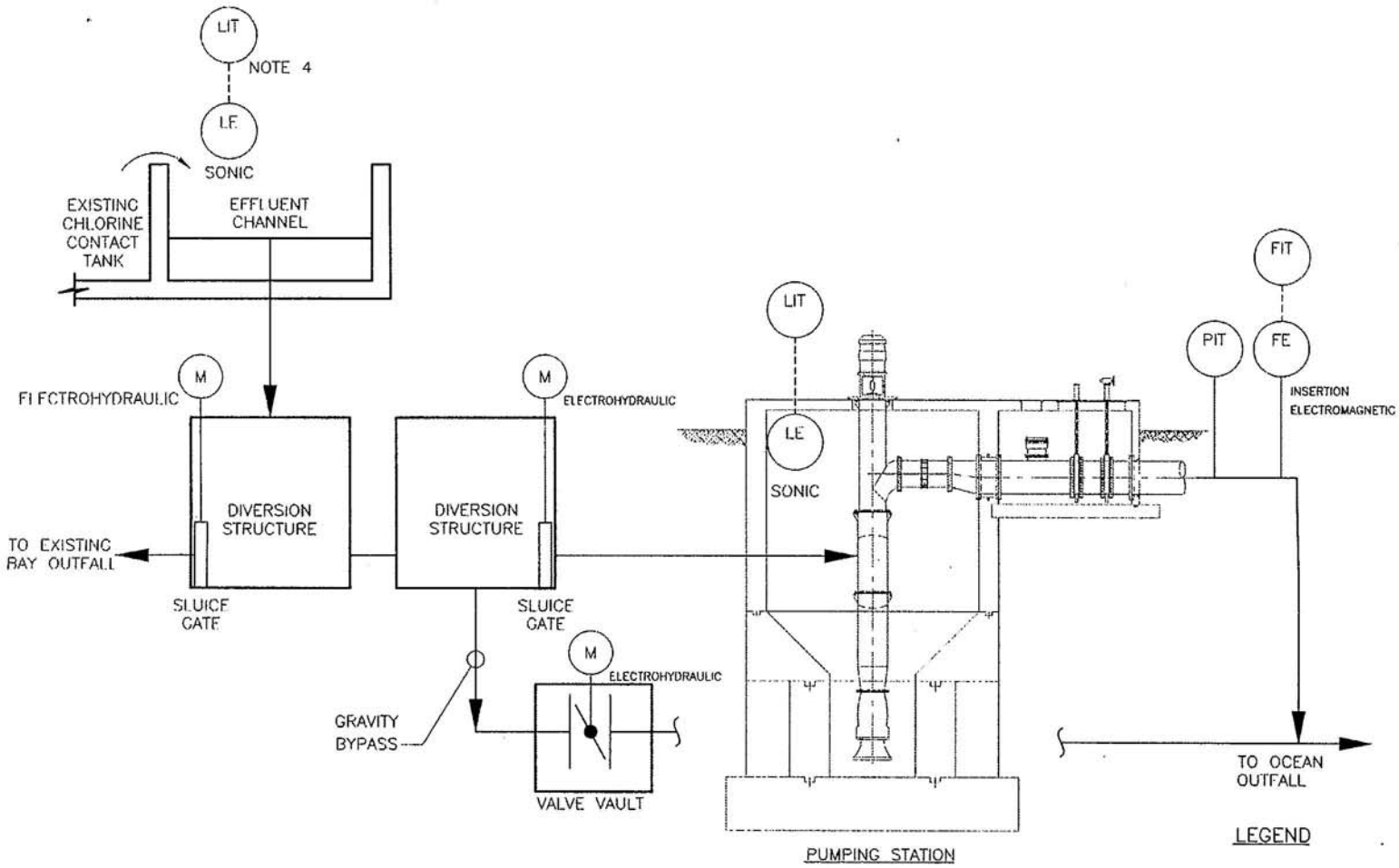
NOTES:

1. PUMPS ARE ALL CONTROLLED WITH VARIABLE FREQUENCY DRIVES.
2. LEVEL TRANSMITTER IN CHLORINE CONTACT TANK EFFLUENT CHANNEL WILL OPEN SLUICE GATE TO PUMPING STATION, CLOSE VALVE ON GRAVITY BYPASS AND INITIATE PUMPING UPON A HIGH LEVEL.
3. LEVEL TRANSMITTER IN WET WELL SHALL CONTROL THE PUMPS. SEE "PUMP CONTROL PROFILE" THIS DRAWING.
4. SOUND ALARM AT HIGH LEVEL IN CHLORINE CONTACT TANK EFFLUENT CHANNEL. SLUICE GATE TO EXISTING BAY OUTFALL SHALL AUTOMATICALLY OPEN ON HIGH–HIGH LEVEL.

LEGEND

FE – FLOW ELEMENT
FIT – FLOW INDICATING TRANSMITTER
LE – LEVEL ELEMENT
LIT – LEVEL INDICATING TRANSMITTER
PIT – PRESSURE INDICATING TRANSMITTER

SUBMERSIBLE PUMPS IN WET WELL/DRY WELL
WET WELL PROCESS FLOW DIAGRAM



NOTES:

1. PUMPS ARE ALL CONTROLLED WITH VARIABLE FREQUENCY DRIVES.
2. LEVEL TRANSMITTER IN WET WELL WILL INITIATE PUMPING UPON A HIGH LEVEL.
3. LEVEL TRANSMITTER IN WET WELL SHALL CONTROL THE PUMPS. SEE "PUMP CONTROL PROFILE" THIS DRAWING.
4. SOUND ALARM AT HIGH LEVEL IN CHLORINE CONTACT TANK EFFLUENT CHANNEL. SLUICE GATE TO EXISTING BAY OUTFALL SHALL AUTOMATICALLY OPEN ON HIGH-HIGH LEVEL.

LEGEND

FE – FLOW ELEMENT

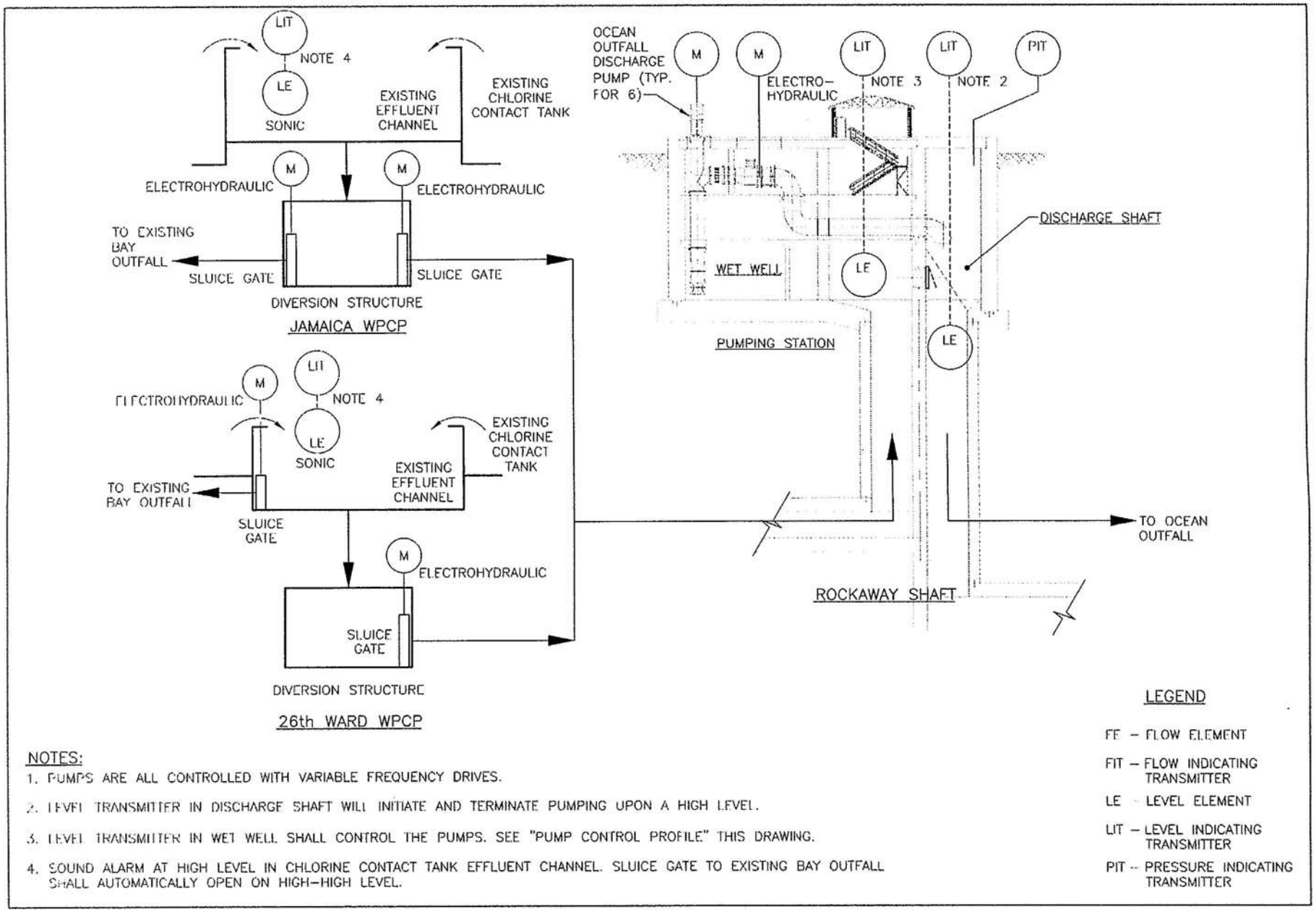
FIT – FLOW INDICATING TRANSMITTER

LE – LEVEL ELEMENT

LIT – LEVEL INDICATING TRANSMITTEF

PIT – PRESSURE INDICATING TRANSMITTER

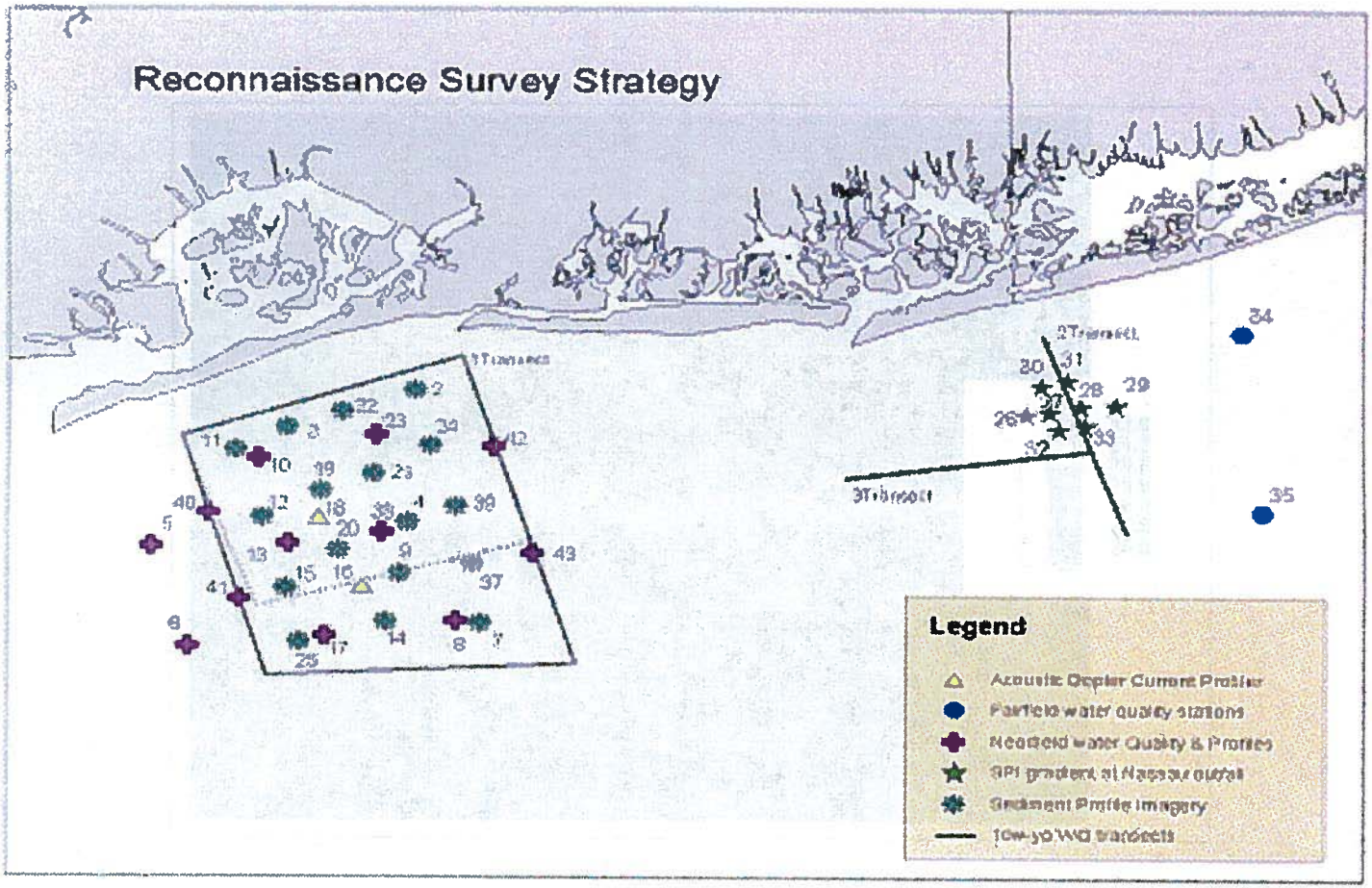
MIXED FLOW PUMPS IN TRENCH
WET WELL PROCESS FLOW DIAGRAM



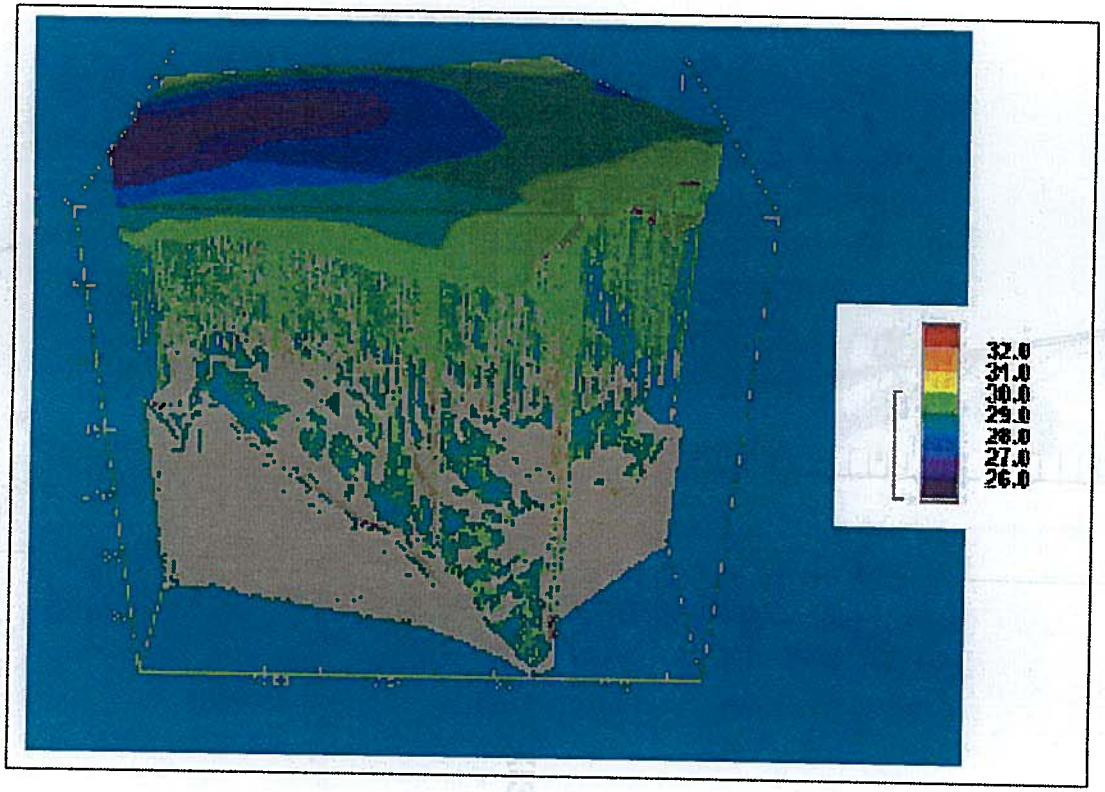
NOTES:

1. PUMPS ARE ALL CONTROLLED WITH VARIABLE FREQUENCY DRIVES.
2. LEVEL TRANSMITTER IN DISCHARGE SHAFT WILL INITIATE AND TERMINATE PUMPING UPON A HIGH LEVEL.
3. LEVEL TRANSMITTER IN WET WELL SHALL CONTROL THE PUMPS. SEE "PUMP CONTROL PROFILE" THIS DRAWING.
4. SOUND ALARM AT HIGH LEVEL IN CHLORINE CONTACT TANK EFFLUENT CHANNEL. SLUICE GATE TO EXISTING BAY OUTFALL SHALL AUTOMATICALLY OPEN ON HIGH–HIGH LEVEL.

OCEAN OUTFALL SHAFT PUMP STATION
PROCESS FLOW DIAGRAM



OFFSHORE FEASIBILITY STUDY LOCATIONS



THREE-DIMENSIONAL INTERPRETATION OF SALINITY DATA
SHOWING HUDSON RIVER PLUME EFFECT