MidAtlantic
Engineering Partners

June 30, 2021 Project #: CMU-201

Via Email (Laroccotj@cmcmua.com)

Cape May County M.U.A
1523 Route 9 North
Swainton, NJ 08210

Attention: Mr. Thomas LaRocco, PE

Reference: 2021 Riser Inspection

Dear Mr. LaRocco:

MidAtlantic Engineering Partners, LLC (MidAtlantic), performed the annual Underwater Riser Inspection of three ocean outfalls located off the shores of Wildwood, Avalon and Ocean City New Jersey.

The purpose of the inspection was to document existing conditions, material type, height, flow quality from the diffuser ports and perform up to twenty (20) cleaning of restricted ports.

The inspection was performed between June 2nd and June 10th, 2021, at the request Cape May County M.U.A, in accordance with standards of the American Society of Civil Engineers Waterfront Facilities Inspection and Assessment Manual (No. 130). The underwater inspection was performed from a fully equipped dive vessel by a three-person ADCI dive team composed of a Professional Engineer-Diver registered in the State of New Jersey, Engineer-Diver, and an Engineer-Dive Supervisor.

This information presented in this inspection report includes a description of the three sites, and observed conditions. The appendices contain a detailed diffuser report for each site (Appendix A).

Please do not hesitate to contact myself with any questions at 646.852.0473 or Slewis@midatlanticeng.com.

Respectfully Submitted,

MidAtlantic Engineering Partners, LLC

W. Stuart Lewis, P.E.
Sr. Project Manager

Attachments Inspection Report
Appendix A – Diffuser Report

EXECUTIVE SUMMARY

The Wildwood 42-inch main trunk line cleanout riser is in overall **Fair** condition. Due to light flow escaping from about the bottom flange as of a result of every other bolt hole being connected. Three(3) bolts were hand tightened. All bolts installed have double nuts.

The North leg of Wildwood/Lower region outfall is in overall **Fair** condition due diffuser No. 52 missing, diffuser 51 having no flow and diffuser 33 being broken off at the mudline with the top five(5) of riser being connected by one (1) bolt.

The South leg of Wildwood/Lower region outfall is in overall **Fair** condition due to 21-percent or eleven (11) diffusers (42 thru 52) having no flow and diffuser 1 missing. The clean-out on the outfall was missing every other bolt with flow coming out from the bottom flange.

Seven Mile Beach/Middle region outfall is overall **Poor** condition due to 23-percent or nine (9) diffusers (29-39) having no flow. Additionally, located at Seven Mile Beach there are two broken risers (17 & 19). These risers are scheduled to be replaced this year.

Ocean City outfall is in **Good** condition with only 9-percent of the risers exhibiting poor or no flow.

INTRODUCTION

MidAtlantic Engineering Partners (MidAtlantic) was retained by Cape May County M.U.A, to perform the annual Underwater Riser Inspection of three ocean outfalls located off the shores of Wildwood, Avalon and Ocean City New Jersey. The inspection was performed over the course of four day between June 2nd to June 10th, 2021 and included an underwater inspection of all risers, and cleanouts of the ocean outfall systems. The primary objectives of the inspection were to assess the general condition of the risers, note material type, height and quality of flow from the diffuser ports.

Methodology

The inspection of the risers was conducted by a three-person engineer dive team. The underwater portion of the inspection was performed in conformance with applicable OSHA and USCG regulations governing safe Commercial Diving Practices (29 CFR 1910 Subpart T and 46 CFR 197 Subpart B), and MidAtlantic's safe diving practices manual. Diving operations were staged from a fully equipped 26 ft dive vessel using surface supplied dive equipment with continuous hardwired and video communications to topside personnel.

Representatives from Cape May County M.U.A. were on the vessel watching the live dive video feed from the divers underwater camera, for all days of inspection.

Condition Assessment Criteria

The Condition Assessment Rating can be interpreted as the "health" of the systems comprising the structure. The Condition Assessment Rating (CAR) is driven by the information gathered during the investigation process. Defect severity, quantity, frequency, and impact to the outfall operations are processed to derive the defined Condition Assessment Ratings. Standardized Condition Assessment Ratings are required to categorize the results of the inspection and provide a basis for comparison of the defect effects against the deficiencies and known results in outfalls. The ability

to generate an accurate comparison across large amounts of data, historic or current, is required for a successful waterfront management plan.

The Condition Assessment criteria, used during this inspection consisted of flow quality from the diffuser ports; good, fair, poor, none or missing riser.

A condition assessment criteria rating is assigned to each element inspection during the investigation. The rating reflects the condition of the individual element only and is independent of the element's structural importance or type of inspection being conducted. The elemental damage ratings are standardized to provide a qualitative description of an element's condition based on a quantified level of damage.

DESCRIPTION

The Wildwood/Lower Region outfall consisted of a single main 42-inch trunk line with two branch legs represented as North leg and South Leg. Each leg of the outfalls consists of fifty-two (52) diffuser risers each with a 20-inch offshore cleanout riser. There is an additional 42-inch in-line cleanout riser on the main trunk.

Seven Mile Beach/Middle Region outfall consisted of a single main trunk line with thirty-nine (39) diffusers risers and a 20" offshore cleanout riser.

Ocean City Region outfall consisted of a single main trunk line with sixty-one (61) diffuser risers, a 36-inch in-shore cleanout riser and a 24-inch offshore cleanout riser.

OBSERVED CONDITIONS

Below is a summary of each ocean outfall inspected with the flow condition of each riser. We have provided a summary of flow conditions per each outfall inspected and assigned a condition rating to each outfall.

Wildwood/Lower Region Main Trunk Line Clean-out

The Wildwood 42-inch main trunk line cleanout riser is in overall **Fair** condition. Due to light flow escaping from the bottom flange as of a result of every other bolt being connected. The overall height of the outfall riser is 75-inches. Coating is still intact.

North Leg of Wildwood

The North leg of Wildwood/Lower region outfall is in overall **Fair** condition due diffuser No. 52 missing, diffuser 51 having no flow and diffuser 33 riser being broken at the mudline. A summary of the condition ratings for the risers is represented below

Table 1: Summary of North Leg Condition Ratings

COMPONENT	TOTAL NO. INSPECTED	FLOW GRADE									
		MISSING		NONE		POOR		FAIR		GOOD	
		NO	%	NO.	%	NO.	%	NO.	%	NO.	%
Risers	52	1	1.9	17	32.6	1	1.9	0	0	33	63.4

South Leg of Wildwood

The South leg of Wildwood/Lower region outfall is in overall **Fair** condition due to 21-percent or eleven (11) diffusers (42 through 52) having no flow and diffuser 1 missing.

Table 2: Summary of South Leg Condition Ratings

Component	Total No. Inspected	Flow Grade									
		Missing		None		Poor		Fair		Good	
		No	%	No.	%	No.	%	No.	%	No.	%
Risers	52	0	0.0	11	21.1	0	0.0	0	0.0	40	76.9

Seven Mile Beach

Seven Mile Beach/Middle region outfall is overall **Poor** condition due to 28-percent or nine (9) diffusers (29-39) having no flow. Additionally, located at Seven Mile Beach there are two (2) broken risers (17 and 19), that will be repaired in 2021.

Table 3: Summary of Seven Mile Beach Condition Ratings

Component	Total No. Inspected	Flow Grade									
		Missing		None		Poor		Fair		Good	
		No	%	No.	%	No.	%	No.	%	No.	%
Risers	39	-	-	9	23.0	2	5.1	0	0.0	28	71.7

Ocean City

Ocean City outfall is in **Good** condition with only 11-percent or nine (9)of the risers exhibiting poor or no flow.

Table 4: Summary of Ocean City Condition Ratings

Component	Total No. Inspected	Flow Grade									
		Missing		None		Poor		Fair		Good	
		No	%	No.	%	No.	%	No.	%	No.	%
Risers	61	-	-	6	9.8	2	3.2	2	3.2	51	83.6

RECOMMENDATIONS

MidAtlantic will performed the replacement of the found broken risers at Seven Mile and Wildwood North. Based on the change in condition from previous years inspection MidAtlantic recommends continuing with the annual inspection program.

APPENDIX A

DETAILED NOTES

Location	Diffuser No.	2021 Inspection					
		Riser Material	Opening Direction	Ht above ML (ft)	Flow	Maint Perform?	Comments
Ocean City	C.O.						
Ocean City	C.O.	Steel					steel, ht - 106in
Ocean City	1	HDPE	North	8	Good	No	
Ocean City	2	Steel	South	9	Good	No	
Ocean City	3	Steel	North	8	Good	No	
Ocean City	4	Steel	South	9	Good	No	
Ocean City	5	Steel	South	8	Good	No	
Ocean City	6	Steel	South	8	Good	No	
Ocean City	7	Steel	North	8	Poor	Yes	
Ocean City	8	Steel	South	8	Good	No	
Ocean City	9	Steel	North	8	Good	No	
Ocean City	10	Steel	South	7	Good	No	
Ocean City	11	Steel	North	8	Fair	No	
Ocean City	12	Steel	South	7	Good	No	
Ocean City	13	Steel	North	9	Good	No	
Ocean City	14	Steel	South	10	Good	No	
Ocean City	15	Steel	North	8	Good	No	
Ocean City	16	Steel	South	11	Good	No	
Ocean City	17	Steel	North	8	Poor	Yes	
Ocean City	18	Steel	South	10	Good	No	
Ocean City	19	Steel	North	10	Good	No	
Ocean City	20	Steel	South	8	Good	No	
Ocean City	21	Steel	North	9	Good	No	
Ocean City	22	Steel	South	10	Fair	No	
Ocean City	23	Steel	North	10	Good	No	
Ocean City	24	Steel	South	11	Good	No	
Ocean City	25	HDPE	South	9	Good	No	
Ocean City	26	HDPE	South	10	Good	No	
Ocean City	27	Steel	North	9	Good	No	
Ocean City	28	Steel	North	10	Good	No	
Ocean City	29	Steel	North	10	Good	No	
Ocean City	30	Steel	South	10	Good	No	
Ocean City	31	Steel	South	9	Good	No	
Ocean City	32	Steel	South	10	Good	No	
Ocean City	33	Steel	North	11	Good	No	
Ocean City	34	Steel	South	12	Good	No	
Ocean City	35	Steel	North	12	Good	No	
Ocean City	36	Steel	South	10	Good	No	
Ocean City	37	Steel	North	12	Good	No	
Ocean City	38	Steel	South	10	Good	No	
Ocean City	39	Steel	North	10	Good	No	
Ocean City	40	Steel	South	9	Good	No	
Ocean City	41	Steel	North	11	Good	No	
Ocean City	42	Steel	South	10	Good	No	
Ocean City	43	Steel	South	9	Good	No	
Ocean City	44	Steel	North	9	Good	No	
Ocean City	45	Steel	South	9	Good	No	
Ocean City	46	Steel	North	10	Good	No	
Ocean City	47	Steel	South	10	Good	No	
Ocean City	48	Steel	North	10	Good	No	
Ocean City	49	Steel	South	9	Good	No	
Ocean City	50	Steel	North	9	Good	No	
Ocean City	51	Steel	South	10	Good	No	
Ocean City	52	Steel	South	10	Good	No	
Ocean City	53	Steel	South	10	Good	No	
Ocean City	54	Steel	South	11	None	Yes	Attempted to clear
Ocean City	55	Steel	South	9	Good	No	
Ocean City	56	Steel	North	9	Good	No	
Ocean City	57	Steel	North	9	None	Yes	Attempted to clear
Ocean City	58	Steel	South	10	None	Yes	Attempted to clear
Ocean City	59	Steel	North	11	None	Yes	Attempted to clear
Ocean City	60	Steel	South	9	None	Yes	Attempted to clear
Ocean City	61	FRP	North	9	None	Yes	Attempted to clear
Ocean City	C.O.	Steel		8			

Location	Diffuser No.	2021 Inspection					
		Riser Material	Opening Direction	Ht above ML (ft)	Flow	Maint Perform?	Comments
Avalon/Seven Mile	1	Steel	South	5	Good	No	
Avalon/Seven Mile	2	Steel	North	5	Good	No	Small leak observed in top flange
Avalon/Seven Mile	3	Steel	South	4	Good	No	
Avalon/Seven Mile	4	Steel	North	5	Good	No	
Avalon/Seven Mile	5	Steel	South	5	Good	No	Top 5' FRP
Avalon/Seven Mile	6	Steel	North	5	Good	No	
Avalon/Seven Mile	7	Steel	South	5	Good	No	Top 5' FRP
Avalon/Seven Mile	8	Steel	North	5.5	Good	No	
Avalon/Seven Mile	9	HDPE	North	8	Good	No	
Avalon/Seven Mile	10	HDPE	South	8.5	Good	No	
Avalon/Seven Mile	11	HDPE	North	10	Good	No	
Avalon/Seven Mile	12	HDPE	North	10	Good	No	
Avalon/Seven Mile	13	Steel	South	6	Good	No	No Leak Noted
Avalon/Seven Mile	14	Steel	North	6.5	Good	No	
Avalon/Seven Mile	15	Steel	South	5	Good	No	
Avalon/Seven Mile	16	Steel	North	6	Good	No	
Avalon/Seven Mile	17	Steel	South	5	Good	Yes	Broke @ Base 2020 Inspection
Avalon/Seven Mile	18	Steel	North	6	Good	No	close to 17, ~5 ft
Avalon/Seven Mile	19	HDPE	NW	12	Good	Yes	Riser broke at the trunk flange, the riser flange is still attached. Needs to be excavted aprox. 12", flange removed.
Avalon/Seven Mile	20	Steel	North	6	Good	No	
Avalon/Seven Mile	21	Steel	South	5	Good	No	
Avalon/Seven Mile	22	Steel	North	6	Good	No	
Avalon/Seven Mile	23	Steel	South	6	Good	No	
Avalon/Seven Mile	24	Steel	North	6	Good	No	
Avalon/Seven Mile	25	Steel	South	6	Good	No	
Avalon/Seven Mile	26	Steel	North	6	Good	No	
Avalon/Seven Mile	27	Steel	South	6	Good	No	
Avalon/Seven Mile	28	Steel	North	6	Good	No	Top 5' FRP
Avalon/Seven Mile	29	Steel	South	7	None	Yes	1"x3" hole in southern diffuser arm
Avalon/Seven Mile	30	Steel	North	6	Poor	Yes	Attempted to clean.
Avalon/Seven Mile	31	Steel	South	6	Poor	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	32	Steel	North	5	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	33	Steel	South	6	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	34	Steel	North	5	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	35	Steel	South	5	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	36	Steel	North	5	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	37	Steel	South	5	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	38	HDPE	East	3	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	39	Steel	South	6	None	Yes	Extremely heavy marine growth, attempted to clean.
Avalon/Seven Mile	C.O.	Steel		8			Hardware MN

Location	Diffuser No.	2021 Inspection					
		Riser Material	Opening Direction	Ht above ML (ft)	Flow	Maint Perform?	Comments
Wildwood North	1	Steel	North	4	Good	No	
Wildwood North	2	Steel	South	5	Good	No	
Wildwood North	3	Steel	North	6	Good	No	south ear bent upward
Wildwood North	4	HDPE	North	6	Good	No	
Wildwood North	5	Steel	North	6	Good	No	
Wildwood North	6	Steel	South	6	Good	No	
Wildwood North	7	Steel	North	6	Good	No	
Wildwood North	8	Steel	South	6	Good	No	
Wildwood North	9	Steel	North	6	Good	No	
Wildwood North	10	Steel	South	6	Good	No	
Wildwood North	11	Steel	North	5	Good	No	
Wildwood North	12	HDPE	North	5	Good	No	
Wildwood North	13	Steel	North	5	Good	No	
Wildwood North	14	Steel	South	5	Good	No	
Wildwood North	15	Steel	North	5	Good	No	
Wildwood North	16	Steel	South	7	Good	No	
Wildwood North	17	Steel	North	6	Good	No	
Wildwood North	18	Steel	South	5.5	Good	No	
Wildwood North	19	Steel	North	6	Good	No	
Wildwood North	20	Steel	South	6	Good	No	
Wildwood North	21	Steel	North	6	Good	No	
Wildwood North	22	Steel	South	5.5	Good	No	
Wildwood North	23	FRP	North	6	Good	No	
Wildwood North	24	HDPE	South	5	Good	No	
Wildwood North	25	HDPE	North	5	Good	No	
Wildwood North	26	Steel	South	5.5	Good	No	
Wildwood North	27	Steel	North	5.5	Good	No	
Wildwood North	28	Steel	South	5.5	Good	No	
Wildwood North	29	Steel	North	5.5	Good	No	
Wildwood North	30	Steel	South	5.5	Good	No	
Wildwood North	31	Steel	North	5	Good	No	
Wildwood North	32	Steel	South	5.5	Good	No	
Wildwood North	33	HDPE	South	5	Good	Yes	Top 5' diffuser section bent over, 1 bolt remaining & bent.
Wildwood North	34	Steel	South	5	Poor	No	
Wildwood North	35	Steel	North	5	None	No	
Wildwood North	36	Steel	South	4.5	None	No	
Wildwood North	37	Steel	North	4.5	None	No	
Wildwood North	38	Steel	South	5	None	No	
Wildwood North	39	Steel	North	4.5	None	No	
Wildwood North	40	Steel	South	4.5	None	No	
Wildwood North	41	Steel	North	4.5	None	No	
Wildwood North	42	Steel	South	4	None	No	
Wildwood North	43	Steel	North	4	None	No	
Wildwood North	44	Steel	South	3	None	No	
Wildwood North	45	Steel	North	4	None	No	
Wildwood North	46	Steel	South	4	None	No	
Wildwood North	47	Steel	North	4	None	No	
Wildwood North	48	Steel	South	4	None	No	
Wildwood North	49	Steel	North	3.5	None	No	
Wildwood North	50	Steel	South	3	None	No	south ear bent upward
Wildwood North	51	HDPE	North	4	None	No	
Wildwood North	52					No	Missing, Blind flange previously installed.
Wildwood North	C.O.	Steel		5	None	No	
Willdwood Main Trunk	C.O.	Steel		5			Everyother bolt is connected. Coating intact. 3 bolts were hand tighened. Lite flow noted but area couldn't be isolated.

Location	Diffuser No.	2021 Inspection					
		Riser Material	Opening Direction	Ht above ML (ft)	Flow	Maint Perform?	Comments
Wildwood South	1						Missing, Blind flange previously installed.
Wildwood South	2	FRP	South	9	Good	No	
Wildwood South	3	Steel	North	7	Good	No	
Wildwood South	4	Steel	South	5	Good	No	
Wildwood South	5	Steel	North	6	Good	No	
Wildwood South	6	Steel	South	5	Good	No	
Wildwood South	7	HDPE	South	6	Good	No	
Wildwood South	8	Steel	South	6	Good	No	
Wildwood South	9	Steel	North	4	Good	No	
Wildwood South	10	HDPE	North	5	Good	No	
Wildwood South	11	Steel	North	4	Good	No	
Wildwood South	12	Steel	South	4	Good	No	
Wildwood South	13	Steel	North	4	Good	No	
Wildwood South	14	Steel	South	4	Good	No	
Wildwood South	15	Steel	North	4	Good	No	
Wildwood South	16	HDPE	East	6	Good	No	
Wildwood South	17	HDPE	West	6	Good	No	
Wildwood South	18	Steel	South	4	Good	No	
Wildwood South	19	Steel	North	4	Good	No	
Wildwood South	20	Steel	South	4	Good	No	
Wildwood South	21	Steel	North	4	Good	No	
Wildwood South	22	Steel	South	5	Good	No	
Wildwood South	23	Steel	North	4	Good	No	
Wildwood South	24	Steel	South	4	Good	No	
Wildwood South	25	HDPE	North	4	Good	No	
Wildwood South	26	Steel	South	4	Good	No	
Wildwood South	27	Steel	North	5	Good	No	
Wildwood South	28	Steel	South	6	Good	No	
Wildwood South	29	Steel	North	5	Good	No	
Wildwood South	30	Steel	South	5	Good	No	
Wildwood South	31	Steel	North	3	Good	No	
Wildwood South	32	Steel	South	6	Good	No	
Wildwood South	33	Steel	North	5	Good	No	
Wildwood South	34	Steel	South	5	Good	No	
Wildwood South	35	HDPE	West	6	Good	No	
Wildwood South	36	HDPE	West	6	Good	No	
Wildwood South	37	Steel	North	5	Good	No	
Wildwood South	38	Steel	South	4	Good	No	
Wildwood South	39	Steel	North	4	Good	No	
Wildwood South	40	Steel	South	6	Good	No	
Wildwood South	41	Steel	North	4	Good	No	
Wildwood South	42	HDPE	West	7	None	No	
Wildwood South	43	Steel	North	5	None	No	
Wildwood South	44	Steel	South	3	None	No	
Wildwood South	45	Steel	North	3	None	No	
Wildwood South	46	HDPE	East	7	None	No	
Wildwood South	47	HDPE	SE	7	None	No	
Wildwood South	48	HDPE	North	5	None	No	
Wildwood South	49	HDPE	South	4	None	No	
Wildwood South	50	HDPE	North	4	None	No	
Wildwood South	51	HDPE	South	4	None	No	
Wildwood South	52	HDPE	South	5	None	No	
Wildwood South	C.O.	Steel		1	None	No	Heavy Marine Growth